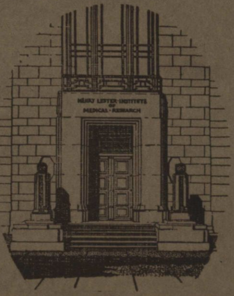
HENRY LESTER
INSTITUTE OF
MEDICAL RESEARCH

Annual Report

1934



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HENRY LESTER INSTITUTE OF MEDICAL RESEARCH

Annual Report

1934

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(SHANGHAI)

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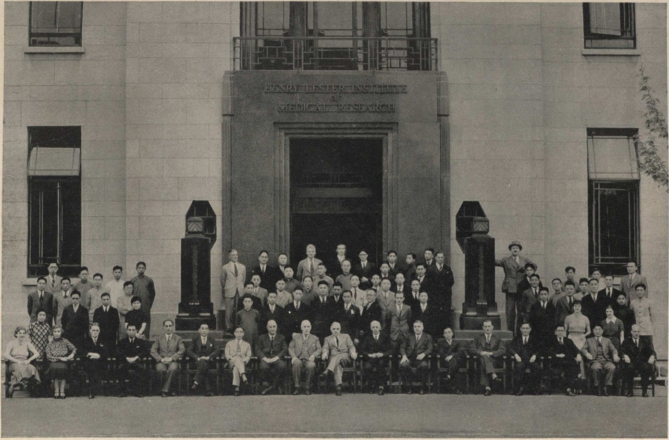

Staff, April 1935

INTRODUCTION

THE year 1934 represents the first full working year of the Institute though during the latter half of the year both the Director and Dr. Robertson, Head of the Division of Pathological Sciences, were absent on leave in Great Britain. Dr. Robertson travelled by America and did much useful work in making the reputation of the Institute known abroad by lecturing to his film on schistosomiasis, which was prepared at the Institute to show the wide range of investigation involved in such problems.

While in England, through the kind offices of Major Edge of the London School of Hygiene and Tropical Medicine, the Director was able to secure the services of Mr. E. A. G. Shrimpton of the London School of Economics for the post of Registrar at the Institute. Mr. Shrimpton will be largely occupied in administrative detail, but it is hoped there will be opportunities for utilizing his special knowledge of statistics in the various research problems presented to the Institute.

Two important conferences in which the Institute took its part were held in 1934. In April, the Second Biennial Conference of the Chinese Medical Association met in Nanking while in October, the Triennial Congress of the Far Eastern Association of Tropical Medicine was held for the first time in China. In addition to sending representatives to the Congress, the Institute had the privilege of entertaining the overseas delegates at a reception held on September 28th. During the year the Institute continued to maintain its contact with outside medical practitioners and scientific workers by weekly lectures, the subjects of which appear in an appendix to this report. The Institute is not primarily a teaching institution but it is the policy of the Institute, not only to train research workers but to popularize, as far as possible, the work of research through the medium of public lectures and demonstrations. A special feature of these lectures is their illustration and for this we are much indebted to Mr. R. V. Dent, Associate in Scientific Photography. In addition to these weekly meetings of the whole staff with outside workers each Division meets regularly in conference, while special courses in technical methods are given for the benefit of the technical staff. The Institute has also been used regularly for meetings of the Shanghai Medical Society and for occasional meetings of other societies, while the visitors' list in the library shows that the Institute is rendering a general service to medical workers.

Details with regard to the research carried out by the Divisions of the Institute are given in the Divisional reports. It may be as well, however, by way of introduction to refer to some general principles of medical research which guide the work of the Institute as a whole.

THE SCOPE OF MEDICAL RESEARCH

It is generally stated that the object of medical research is to cure and prevent disease but I would like to draw attention to the formula which has been adopted by the British Government to define the field of medical research work carried out under the direction of its Medical Research Council:—" Medical research deals with the proper development and the right use of the human body in all conditions of activity and environment as well as with its protection from disease and accident and its repair." It will be noticed in this definition that " protection from disease and accident and its repair " comes at the end of the definition and not at the beginning, and I would therefore like to stress the view that disease is a general biological problem and that all medical research should have a fundamental philosophical background if it is to be intelligently pursued. Unless we pursue principles in research we become lost in a maze of incomprehensible detail. Dr. Singer, in his " History of Medicine " states that the curse of the science of medicine, as in all sciences, has been the so-called practical man who will consider only the immediate end of his art without regard to the knowledge on which it is based.

Now, the principle of biology most relevant to medical research is perhaps that which affirms that life only maintains itself at the expense of life. This has also been referred to under such phrases as the " struggle for existence " and the " survival of the fittest." In order that man may live he must destroy the life of plants and animals, while the recent work on vitamins shows that food must include, in as fresh a condition as possible, all that is contained in the bodies of the plants and animals consumed. Just as a diet of pure protein, carbohydrate and fat was found to be poisonous and led to the discovery of vitamins and to a recognition of the importance of mineral metabolism, we are also learning that vitamins and salts when taken pure are less effective than when taken in natural form. It is also interesting to note here in parenthesis that since the power of animals to make their food from elementary substances is strictly limited, animals must get their " bausteine " or building stones eventually from plants. This may perhaps explain how it is that substances presumably evolved by the plant in the course of its own metabolism for its own benefit have such a specific relation to the biological activities of animals. I refer more particularly to the specific action of plant alkaloids on nerve endings and to the recent work of Dale and others on the chemical mediation of nervous impulses. This may also perhaps explain why vitamin A, which is formed in the green leaves of plants, has a special relation to sensory neurones and the nutrition of the epithelial surfaces with which these neurones are associated.

Returning once more to this biological principle of nutrition, it also follows that man himself may, and does, become a source of food for other animals and plants ; for green plants, though characterized by a power of photosynthesis, are still dependent on the supply of elementary substances from which to make their " food." In order, therefore, that the stock of elementary substances should not become exhausted in the cycle of nutrition, it is necessary that the complex substances characteristic of the bodies of animals and plants should be once more decomposed and made available for synthesis. This is partly effected by metabolism during life, by autolysis after death, but is only carried out to completion by the fungi which, owing to their general form, seem to be more nearly related to plants and may be described as plants without chlorophyll, though nutritionally they stand in a class by themselves, intermediate between animals and plants. As a group they present a very wide range in metabolism, being capable of many synthetic processes peculiar to plants, as well as analytic processes peculiar to animals. The destruction by saprophytic bacteria of the dead bodies and excreta of plants and animals therefore forms the basis of soil fertility and successful agriculture, while the utilization of " nightsoil " for this purpose is, as is well known, indirectly the cause of much parasitic disease in China.

However, in the case of the pathogenic bacteria and viruses there appears to be a direct attack on the living body ; this was first proved by Pasteur and is generally referred to as the germ theory of disease. It is further recognized that all animals carry, both in their skin and in their alimentary canal, large numbers of non-pathogenic bacteria and that some individuals also carry pathogenic bacteria without exhibiting signs of disease. In all these phenomena what is usually called the resistance of the individual comes into play, and it is probable that in a large number of bacterial attacks some failure on the part of the individual to maintain its normal metabolism or to adapt itself to changes in the external environment is primarily responsible for the attack. Animals, plants and bacteria have evolved together and the life of the one has grown up dependent on the life and death of the other. It is probable that every living individual, whether it be plant or animal, has a life cycle of definite length and that, under ideal conditions, what may be termed physiological death is sufficient to maintain the cycle of nutrition. Owing, however, to the struggle for existence and the failure of physiological processes, disease and premature death cut short the physiological span of life. The problem which confronts man is therefore, how to maintain the cycle of nutrition by controlling the activities of bacteria and parasites for the benefit of plant nutrition without himself being attacked in the process. In this problem he is helped by the general biological defence mechanisms of the animal organism whereby antibodies are produced with the destruction of antigens, and this must be regarded as an integral part of the physiological processes which maintain that constancy of the internal environment which forms the physico-chemical basis of well-being.

Having dealt briefly with the problem of parasitic enemies as a factor in disease, let us return once more to the formula for medical research already quoted when it states that "medical research deals with the proper development of the human body." Now there are two factors in this development which may be referred to under the general terms of inheritance and nutrition. The science of genetics is still in its first infancy in regard to its application to human beings under the heading of Eugenics, though it has been recognized from the earliest times that what is termed the study of constitution, both individual and collective, plays an important part in the study of disease. The science of nutrition, though a little older than that of genetics, is also still young, but the study of vitamins has already shown how important is a study of the qualitative character of the diet as a factor in development.

At the present time the study of disease may therefore be said to involve three factors : genetic, nutritional and parasitic ; but it must be recognized that all these factors may, and do, contribute to the development of a normal or diseased condition. An exact answer to the question " What is a disease ? " can still not be given nor has it been decided in what terms it should be given. The earlier physician defined disease in terms of symptoms, the morbid anatomist in terms of the organ affected, the bacteriologist in terms of the parasite which leads the attack and the biologist in terms of some nutritional or metabolic deficiency. The most complete definition will probably include all these points of view and, in the end, can only be given by the clinician. It is frequently stated to-day that progress in clinical science has not kept pace with progress in the laboratory sciences; Lord Moynihan refers to the truancy of the physiologist, but with men like Sir Thomas Lewis acting under the auspices of the Medical Research Council and with the support of the Rockefeller Foundation it is probable that this lag in development will be remedied and that, in the near future, it will be possible to obtain a more scientific knowledge of disease as it presents itself clinically in the human patient.

We have already accepted, in the organization of the Institute, a division of medical research into three categories—clinical, physiological and pathological. These must always remain the three fundamental divisions of medical research, but within these categories we can make another classification of research into fundamental, historical and applied. By fundamental research I mean investigation into the general biological phenomena of life; by historical research, which is especially important in China owing to the strong hold which native medicine still exercises over the people, I mean investigation into the dietetic and therapeutic practices which, although empirically adopted have produced over a long period of years the Chinese constitution as it exists to-day; by applied research I mean the investigation of special disease problems in the light of biological knowledge previously acquired. When one reviews the work of the Institute in the light of these generalizations it will be seen that it is proceeding along well-defined lines though, if I may say so without offence, it may suffer a little from specialism. That is, however, a defect not peculiar to this Institute but to all scientific research. One must become a specialist before one can become a generalist, but it is well to keep the ultimate goal in view.

DIVISION OF CLINICAL RESEARCH

The work of this Division falls naturally under two headings — medicine and surgery. This time-honoured division of clinical work arises more particularly in relation to practice. In regard to research the surgeon, owing to his technique, has an additional means of examining directly structures inside the body but this does not free him from also using the methods of the physician in his observation of the patient before and after operation. The object of surgical research is not only treatment but knowledge of the condition of the patient which calls for treatment, and in this respect there is no difference between surgical and medical research. Both physician and surgeon must also use the methods of the laboratory sciences but they alone can interpret the results in terms of the condition of the human patient. On the medical side of the Clinical Unit, interest has been centred on those diseases which have a definite nutritional basis or which lend themselves to biochemical investigation on its clinical side. It includes a study of infant nutrition as it is normally practised by the Chinese people, and of the more domestic and economic factors in the choice of the Chinese diet with rice as its main constituent. The beri-beri type of case appears to afford the best clinical material, both owing to quantity and variety, for the study of nutritional deficiency as a factor in disease. Dr. Platt has shown that vitamin A deficiency also plays an important part as well as vitamin B deficiency in the development of symptoms. In this respect, his work confirms the results of Mellanby on the importance of vitamin A deficiency in the development of nerve disease. On the surgical side, such important problems as peptic ulcer, appendicitis and urinary infections are being intensively investigated. This work is being supplemented by experimental work on animals whereby the physiological and pathological processes underlying these clinical conditions are being explored.

DIVISION OF PHYSIOLOGICAL SCIENCES

Professor Read has always recognized since he came to China that if scientific medicine is to be accepted by the Chinese people it is essential that the scientific basis of Chinese medicine should be thoroughly explored. Dr. Read has already published a great deal of work along these lines and is still continuing this work in the Institute. This work is closely related to the general subject of nutrition which is receiving attention from various angles. A soy bean egg powder capable of maintaining growth in young animals has been prepared which, in some ways, is superior to whole milk powder and much lower in cost. A good deal of data on the chemical content of Chinese diets and food stuffs in regard to the proximate principles, vitamin and mineral content, have already been obtained and are in process of investigation.

An interesting piece of work has also been carried out on the chemical changes taking place during the germination of the soy bean in the dark.

The physiological relationships of vitamins have also been investigated, while Dr. Tsai, who has elaborated a very useful experimental technique for obtaining samples of blood in the living animal without disturbing its normal activities, has advanced our knowledge of glycogen as an internal secretion of the liver in accordance with the view first put forward by Claude Bernard who discovered this substance.

The chief discoveries being made to-day in medical research lie undoubtedly within the field of biochemistry, and this must be extended, not only to physiology but also to bacteriology, immunology and parasitology. There is a danger, however, lest we allow ourselves to think of life too much in terms of chemical equations and find ourselves speaking of the function of a substance instead of its properties. The term " function " should be reserved for those activities of the living cell which direct the reactions of the substances which it contains.

DIVISION OF PATHOLOGICAL SCIENCES This Division, owing to the varying nature of the technique employed in the study of bacteria, parasites, defence mechanisms and tissue responses covers a very wide range of laboratory and field research. As in the case of the Clinical Unit the emphasis is on particular diseases and problems, but here the emphasis is on problems of special importance in relation to the maintenance of public health, for example, typhoid, cholera, the bionomics of the mosquito and the natural history of schistosomiasis. It is interesting to note that all these diseases have a water factor and that the eradication of the disease, the cause of which is known, depends on a radical alteration in the habits of the people. In the case of typhoid, cholera and schistosomiasis, it turns on the disposal and use made of human excreta, and in all it turns on the cultivation of rice as the staple food of the country. The study of mosquito varieties and bionomics has shown that a large number of mosquitoes do not attack man and do not carry disease. This makes it perhaps more practical to make a specific attack on those species which do carry malaria and filaria parasites. At the moment, screening or nets appear the only practical means of dealing effectively with the situation.

In the department of serology, the large amount of material obtained from the Lester Hospital has led to a study of blood tests for syphilis, while in co-operation with the Clinical Unit a study has been made of the complement fixation test in relation to schistosomiasis. A further important piece of work is the study by precipitin tests of the blood swallowed by mosquitoes. An extensive study of blood groups has also been made with a view to the establishment of a blood transfusion service.

The study of the Dick test for scarlet fever, which is being continued by means of a special survey, seems to show that climate rather than susceptibility is responsible for the rarity and mildness of the disease in South China, and that the characters of bacteria and viruses depend very much on the character of the external environment. This is also brought out in the study of viruses by the work of Dr. Tang and his collaborators on the pleuropneumonia of cattle which has shed fresh light on our knowledge of these so-called "ultra-microscopic" organisms. It seems to show that little less than size and a greater dependence on living culture separate the viruses from bacteria and higher fungi, and that their morphology and visibility vary with the medium and the age of the culture.

In tissue pathology Dr. Kau has carried on a good deal of routine work in the examination of specimens for diagnosis but has recently joined the ranks of workers on tissue culture. This is pre-eminently an example of fundamental research and has already thrown light on the general principles of tissue growth, errors in which play so important a part in the development of tumours.

With this introductory statement I would commend the study of this report to all those interested in the work of the Institute, but I would point out that an exact knowledge of what is being done can only be obtained from the publications of the workers themselves.

H. G. Earle

DIRECTORATE

DR. H. G. EARLE

DEPARTMENT OF EPIDEMIOLOGY AND MEDICAL STATISTICS

This department, which was inaugurated with the assistance of Major Edge of the London School of Hygiene and Tropical Medicine, has been carried on by Dr. H. S. Gear with the assistance of Dr. James L. Maxwell.

The most important work during 1934 has been the completion of the Hospital Survey to which reference was made last year, but as will be seen from the report that follows, the scope of work has also been extended in other directions.

The survey has a direct relationship to clinical work since it indicates the incidence of disease in hospital populations. Clinical research must be dictated by the clinical material available, however fundamental one's point of view, and the survey has, in some measure, shown us the clinical problems with which the hospitals have to contend. Further, this work, as shown by many letters received from the co-operating hospitals, has stimulated a spirit of investigation in the hospitals themselves, and has shown the busy hospital practitioner that he is able, in addition to providing for the care of his patient, to do something to increase the general stock of knowledge in regard to the incidence of disease. Though the general survey has now been discontinued, as far as this Institute is concerned, the same machinery is being used for the collection of data which have a direct bearing on the intensive clinical and laboratory work being carried out in the Divisions of the Institute. I am indebted to Drs. Gear and Maxwell for the reports which follow.

(1) CHINESE MEDICAL ASSOCIATION HOSPITAL SURVEY

The number of hospitals providing complete in-patient and out-patient records during 1934 was increased to 26 as against 17 during 1933. The total number of hospitals co-operating numbered 29. The card records, improved in completeness and accuracy, and provided a mass of data of considerable value for the year.

The same system of issuing monthly summaries to each hospital was continued, and at the end of the year, an annual summary of the total patients was prepared for each hospital. This work formed the largest proportion of the activities of the department, and on an average, the technicians had to deal with well over a thousand cards a day, and over fifty monthly summaries a month. The actual figures were :—

Monthly Summaries issued	684
Annual Summaries issued	57

The heavy burden of this routine work prevented the staff from proceeding very rapidly with the detailed analysis of the material required for special reports. However, the following detailed analyses were completed :—

Tumours, Venereal Disease, Tuberculosis, Trachoma, Glaucoma, Cataract, Anterior Poliomyelitis, Cerebrospinal Meningitis, Malaria, and Kala-azar.

Copies of the resulting tabulations were distributed to each hospital. Another important analysis which it was found possible to complete was the age, sex and monthly distribution of the hospital patients recorded.

At the Chinese Medical Association Conference in Nanking in April, the report of the first six months' returns was presented, and later in the year a fuller report on the total returns of the year 1933 was prepared and eventually published. This report briefly pointed out that for the present the only sources available for information of disease incidence and prevalence are the hospitals. In the past it has not been possible to utilize hospital records to any great extent, but with the establishment of the present survey and the adoption of a standard disease classification and uniform methods of collection and analysis, for the first time records of both in-patients and out-patients from all provinces were made available. The results based on the short disease classification demonstrated that the principal groups of conditions being met with in hospitals were :— Diseases of the Skin, Injuries and Conditions of Violence, Diseases of the Digestive System, Venereal Diseases, and Tuberculosis in this order. Further, disease groups were considered in the report in relation to their geographical distribution and relative incidence.

The second report was based on the analysis of the age and sex constitution of the hospital populations. This is an extremely important consideration in comparing disease incidence in different areas and countries, and the interesting fact was established, that

Chinese hospital populations belonging to the adolescent and young middle-aged group, differed markedly from an American hospital population and most probably from European populations. In estimating the relative proportion of diseases such as cardiac and renal disease in different populations, allowance must be made for age constitution. Hospital experience in China alone does not suffice for claiming that such conditions are less prevalent here than in the West.

The next step in the utilization of the mass of data collected by the Survey was the commencement of the detailed analysis of each disease, considering such factors as age, sex, season and locality. Commencement was made with tumours, venereal disease and tuberculosis. Other studies which have reached the reporting stage are :—Trachoma, Glaucoma, Cataract, and Diseases of the Nervous System, while in preparation are :—Kala-azar and Malaria. In the immediate future analyses will be commenced of :—Respiratory Disease, a group of infectious diseases including Measles, Scarlet fever, Diphtheria, Influenza, and Ear conditions.

In preparation at present too, is the report of the aggregate returns of 1934, which it is hoped to complete as soon as the few outstanding card records have been received.

The extraction of the facts required for the above studies by no means exhausts the information to be derived from the data collected during the two years 1933 and 1934, and it will be possible to consider several other diseases in relation to their age and sex incidence and geographical distribution.

Some of the data of the Survey was also discussed in preparing a report on diseases of medical and veterinary interest in China to be mentioned later in this report.

At the Nanking Conference the Chinese Medical Association had decided that the General Survey, having in two years been fully established and the practicability of its methods demonstrated, should no longer be retained as a part of the function of the Council on Research, but the machinery should be maintained for carrying on special investigations. Previous negotiations were further strengthened by a visit to Nanking in October, when various persons wert interviewed with the object of the government taking over the General Survey. Dr. S. C. Hsu eventually visited the department for several days, and as a result, the National Health Administration agreed to develop a modified survey based on the work already done. This was a most gratifying development, as the most important and fundamental work of collecting morbidity statistics of China will be continued, and it is hoped, expanded and improved.

There does not seem any reason for considering the Survey as carried out by the Lester Institute during the last two years, as anything but a success. In one of the greatest of voluntary collective investigations most valuable and fundamental data have been collected on disease incidence in all parts of China. Its virile state even after two years is indicated by the numerous requests from hospitals desiring to join the scheme, and by co-operating medical officers who have written acknowledging its usefulness both to themselves and others, and who would like to see it continued. It has served its purpose to the extent of mobilizing the information concerning disease prevalence and incidence previously left buried in hospital registers, or not even recorded. This information, while of undoubted value as a base line for the study of scientific and academic medical problems in China, is the necessary fundamental requirement for practical policies of medical and public health activities for both hospital and national authorities. Medical superintendents and others have already expressed the opinion that the information provided by the survey reports has guided them in budgeting for future requirements, and in planning a more suitable distribution of their facilities and staff to suit the needs of the patients appealing for treatment.

Finally, its greatest reward has been perhaps in the stimulation of investigation and enquiry among many medical officers. Several have commenced investigations in their own areas, and others have found in the Survey monthly summaries, material for valuable contributions to medical knowledge.

(2) SPECIAL SURVEYS

Dr. Earle, the retiring Chairman of the Council on Research, in his speech at the Conference of the Association in Nanking last April, suggested that though it was not possible for the Institute to continue the General Survey, it would be willing to conduct special surveys using the same organization. This proposal was adopted, and Dr. Maxwell, undertook the necessary preparatory work in November and December. A letter was circulated not only to the co-operating hospitals of the General Survey, but also to all mission hospitals and all other hospitals with a bed capacity of over 30, inviting participation in one or more subjects suggested by the Council on Research. These subjects were as follows :—

> Acute abdomen, Appendicitis, Birth Weights and Infant Growth, Cholera, Dick Test, Dental Caries, Gastric Ulcer, Kala-azar, Leprosy, Malaria, Mottled Enamel, Muscle Abscesses, Pellagra, Stone.

Approximately a hundred hospitals have already given their assent to one or other of these subjects, a most gratifying response and an indication of enthusiasm for medical investigation on the part of hospital medical officers in China. These special surveys will involve team work not only with outside institutions, but with various members of the Institute staff, and this co-operation has been possible through the support of Heads of Divisions.

Survey Publications

H. S. Gear:

(1) "The Incidence of Disease in Selected Hospitals in China for 1933." *Chinese M. J.*, 1934, **48**; p. 758-782.

(2) "The Age, Sex and Monthly Distribution of Hospital Patients in China." *Chinese M. J.*, 1935, **49**; p. 160-175.

(3) "Tuberculosis in China: Incidence of the Various Types." *Chinese M. J.*, 1935, **49**; p. 446-461.

(4) "The Incidence of Tumours, Benign and Malignant, in China." *Chinese M. J.*, 1935, **49**; p. 261-272.

(5) "The Incidence of the Various Forms of Venereal Diseases in China." *Chinese M. J.* (in the press).

(3) ANATOMICAL AND PHYSIOLOGICAL STANDARDS OF THE CHINESE

A commencement was possible in this item of the programme originally put forward for this Department, through the co-operation of Dr. S. H. Yang of the National Medical College, Shanghai. In view of Miss Yang's interest, the particular study selected was:—"The Menstrual Cycle in the Chinese." Over four thousand records were collected, and on analysis, these provided the material for a preliminary report which has since been published. This report indicated differences in the form of the menstrual cycle of a selected group of Chinese girls from that seen in other races.

This investigation is being extended and at present material is being collected for the Department by medical officers in South China: Dr. Fraser, Swatow; Dr. H. E. Campbell, Foochow; Dr. Ruth Milne, Swatow; Dr. J. F. Karcher, Canton, and Dr. N. M. Leung, Canton. It is expected that the analysis of the results will enable the geographical factor to be considered in relation to this physiological function.

A second study in furtherance of the above programme of standards, was commenced by including the subject of "Birth Weight and Infant Growth" in the Special Surveys; and this has aroused interest as evidenced by the number of institutions throughout China offering to secure data. As mentioned above, publications have been issued, giving in some detail the physical standards of Chinese adolescents and adults, but hitherto nothing comparable has existed for the youngest ages. The Survey promises to yield this data, the analysis of which should provide a much needed base-line or standard for use by clinicians and investigators of infant conditions.

Publication

S. H. Yang and H. S. Gear :

" The Menstrual Cycle in the Chinese of East Central China." *Chinese M. J.*, 1934, **48** ; p. 642-650.

(4) INDUSTRIAL AND OCCUPATIONAL HYGIENE

This was another of the original programme items, but owing to the demands of the General Survey on the staff, it was not possible to initiate investigations earlier. It was obvious that owing to the various social and political aspects of the question, difficulties of approach would have to be overcome, and accordingly co-operation with Miss Hinder of the Factory Investigation Department of the S.M.C. was sought. Out of this co-operation has arisen a most successful means of visiting factories and examining workers. A preliminary tour of likely industries was undertaken in November, and this decided the choice of printing works as a suitable commencement study. Miss Dju was then detailed by Miss Hinder to negotiate with the owners and managers of printing works. She secured permission from six of these, and in December the first factory was visited twice a week when workers were given a full clinical and physical examination.

Two further groups of small printing establishments have also been investigated, and in spite of racial customs and antipathies of the workers to western medicine, it was possible to secure records of 194 workers. Full blood counts were secured from every case, an examination of supreme importance rendered possible by the use of the South African Institute of Medical Research Method. Already it is apparent that industrial populations in Shanghai are subject to many health disturbances, due to lack of suitable food, bad environment and living conditions, as well as to the specific hazards of their occupations. In many respects this investigation is a pioneer in this field in China, which is bound to become increasingly important with the introduction of Western methods of industrialization. The opportunities are unique as industry is conducted along relatively uncontrolled lines in Shanghai, and on the one hand there is the ancient craft often practised solely by family groups, and on the other, the machine methods and mass production of the West. Health is not considered, disease and hazards have full scope, and the need is urgent for study to determine their effect on the Chinese labouring populations, composed, in many instances, of women and children.

The examination of the employees and the blood examination were rendered possible through the kindness of Dr. H. Gordon Thompson, who placed the services of Dr. T. Y. Li at our disposal and also provided laboratory facilities.

(5) CONDITIONS OF MEDICAL AND VETERINARY INTEREST

A preliminary examination of the Survey records had revealed the high incidence of those forms of non-pulmonary tuberculosis which in Europe and America would be ascribed, in a large proportion of cases, to infection with the bovine tubercle bacillus. It is generally recognized that in China, however, bovine tuberculosis cannot be considered as the source of human tuberculosis, as milk and its products do not enter into the Chinese dietary.

The consideration of the relationship of tuberculosis in man and animals evolved into an examination of the whole question of diseases of medical and veterinary importance. In the collection of material, Dr. Jordan was appealed to, and he kindly agreed that Dr. H. Pedersen should supply what information was in the possession of the S.M.C. Veterinary Division. The literature was surveyed with some care, various official reports consulted, and eventually the present situation was reported in a paper read at the Congress of the Far Eastern Association of Tropical Medicine at Nanking in October.

Publication

H. S. Gear and H. Pedersen :

"Some Diseases Common to Man and Animals in China." Trans. *9th Congress Far Eastern Ass. Trop. Medicine*, 1934, **2**; p. 305-323.

Hospital Reports

Dr. Maxwell continued his own researches into the distribution of diseases in China giving a good deal of time to the analysis of hospital reports. Thanks to suggestions and encouragement given, these reports are very steadily improving, especially as regards their classification of diseases, and therefore constitute a unique source of information which in this special respect is hardly equalled in any other country. In the continued absence of any reliable official statistics of disease, they form our principle source of knowledge of disease distribution.

Leprosy

Dr. Maxwell has also given particular attention to investigations in regard to the problem of leprosy in China, its distribution, the types of the disease especially prevalent in this country, and the methods of handling the leprosy problem from a public health point of view.

As honorary medical adviser both to the Mission to Lepers (International) and the Chinese Mission to Lepers he has been in touch with the problem all over the country. It is only within the last year or two that the matter has aroused any interest in this country generally, and any form of investigation has been uphill work. The past year has seen a complete change in this attitude and at present there is a very marked desire all over the country where leprosy is found to take up the problem seriously. There should be every prospect therefore of a considerable advance in our knowledge of the disease and of the best methods of handling it in the near future.

Visiting Worker

At the close of the F.E.A.T.M. Congress, Dr. H. W. Wade, one of the leading experts in leprosy work, especially as to its pathological aspects, was accepted by the Institute as a visiting worker and carried out laboratory investigations into certain obscure lesions of leprosy as they are found in the Chinese, opportunity being thus afforded for comparing these results with similar work that he had done in the Philippine Islands, India and Africa. After his short visit here, Dr. Maxwell arranged for Dr. Wade to continue the work in Swatow.

Legislation

Archaic and very cruel leprosy legislation has greatly hampered investigation in this country. At the end of last year, Dr. Maxwell met the authorities, including Marshal Chen Chi-tang, in Canton, and is able to report that the result of that visit has been a complete reversal of former legislation in South China, opening the door wide for rational treatment and investigation. He also had the honour of meeting a small Commission appointed by the Government in Hongkong to consider leprosy legislation and, with the help of Professor Nocht, former head of the Hamburg Tropical School, advised the Commission on leprosy legislation in the Colony. The Commission has since reported very much in favour of modern views as to treatment. Work on all aspects of the leprosy problem is being continued.

LIBRARY

Dr. Maxwell has continued to act as Librarian. He reports that apart from routine work, efforts are being made to make the material in the Library more accessible for reference to the members of the staff especially as regards tropical diseases and more particularly with respect to diseases in China.

With this end in view an index of the last ten years of the "Chinese Medical Journal" is being completed. As this will benefit medical workers in China generally, the Chinese Medical Association has asked to be allowed to publish it at the expense of the Association.

An index of articles appearing in the reports of the "Far Eastern Association of Tropical Medicine" is also being prepared. These reports contain many articles of great value which, in the absence of such an index, are almost useless to workers out here. In the past year back numbers of these reports have been secured for the library, so that our file is now complete except for the report of the first meeting.

Various improvements have been made in Library facilities during the past year, and there has been a noticeable increase, both in the number of readers using the Library, and the number of volumes lent. Details in regard to additions to the Library and other matters are given in an appendix, but the special gratitude of the Institute is due to the following for important presentations :—

Rockefeller Institute for Medical Research	Monograph Studies	Nos. 2-23 Vols. 17-91
Director, Medical Services Hongkong	Hongkong Medical and Sanitary Reports	1910-1933
Director, Pasteur Institut Indo-China, Saigon	Archives	Nos. 1-18
Burroughs Wellcome & Company	Reports of Wellcome Tropical Research Laboratories, Khartoum	Nos. 1st-4th
National Quarantine Service	Memorial volumes Reports	 Series 1-5
Tokyo Imperial University	Japanese Journal of Experimental Medicine	Vols. 10-12
Late Professor Walch	Transactions of the 4th Congress, F.E.A.T.M.	Vols. 1-2

DIVISION OF CLINICAL RESEARCH AND EXPERIMENTAL SURGERY

Dr. H. Gordon Thompson

As in previous reports an account is given in this section, under the headings of the departments of Medicine and Surgery, of the principal work done in the Clinical Unit of the Institute, located on the 5th Floor of the Lester Chinese Hospital and in the laboratories of Experimental Surgery at the Henry Lester Institute in Avenue Road.

Although the Hospital is located at a distance of over a mile from the Institute, yet the maintenance of a regular messenger service several times daily has meant that much of the laboratory examination of clinical specimens, which could be readily transported, together with the section cutting of all material obtained by biopsy or operation has been done in the laboratories at Avenue Road. There were four changes in the Staff of the division—Dr. S. T. Hsiu resigned in order to take up an appointment in the S.M.C. Health Department. Dr. P. P. T. Wu was appointed to a Fellowship in Surgery. Mr. C. Y. Lin left to take up a post as Biophysicist in Wuhan University, Wuchang. Mr. E. F. Yang was appointed to a Research Scholarship in Biochemistry.

DEPARTMENT OF MEDICINE

Creatine and Creatinuria

In the department of Clinical Medicine a good part of the time of Dr. B. S. Platt has been occupied with the organization of the department and the training of junior members of the staff in the methods of approach to clinical problems. Dr. Platt has also been checking up some of the normal physiological standards for Chinese and has shown that creatine, usually held to be an abnormal constituent of the urine of males, is commonly present at all ages in Chinese. In conjunction with Miss G. D. Lu, pathological creatinuria has also been studied and high degrees of creatinuria in certain clinical conditions have been described. It appears that the phenomenon has some relationship to metabolic disturbances in the muscles of patients suffering from beri-beri, but its significance has not yet been fully worked out.

G. D. Lu and B. S. Platt :

> "The Occurrence of Creatinuria in Adult Chinese Males." Trans. *Far East'n Assoc'n of Trop. Med.* 1934, **1**; p. 379-386.

B. S. Platt and G. D. Lu :

> "Pathological Creatinuria." Trans. *Far East'n Assoc'n of Trop. Med.* 1934, **2**; p. 605-612.

Beri-beri

Further work has been done on beri-beri with Dr. S. Y. Gin as assistant and additional evidence has been produced to show that this disease, as seen in Shanghai, involves the association of some degree of lack of Vitamins A and C, as well as of Vitamin B_1 as previously supposed. In connection with this work sixty-eight new cases of beri beri were admitted for observation to the research beds of the Clinical Unit during the year 1934. Additional work in conjunction with Dr. S. Y. Gin has been done on the problems of infant feeding, while a start has been made upon the value of rice as a foodstuff.

B. S. Platt and S. Y. Gin :

> "Some Observations on a Preliminary Study of Beri-Beri in Shanghai." Trans. *Far East'n Assoc'n of Trop. Med.* 1934, **2**; p. 407-413.

Electrical Apparatus

With Mr. C. Y. Lin's assistance a cheaper and simpler form of valve electrometer has been designed and also a colorimeter incorporating the photoelectric cell.

B. S. Platt and C. Y. Lin :

> "A Convenient Form of Glass Electrode with Temperature Regulation. Trans. *Far East'n Assoc'n of Trop. Med.* 1934, **2**; p. 719-720.

Schistosomiasis

Dr. T. Y. Li has continued his study of the treatment of Schistosomiasis with Antimony preparations, under the immediate direction of the Head of the Division. Some fifteen cases have been kept under observation and treatment in the wards of the Clinical Unit, and the question of relapse after apparent cure by the newer Antimony preparations has been investigated. The result of this work points to Potassium Antimony Tartrate as being more effective than the newer drugs available—provided that it is given as a course of injections with a suitable dosage. A series of experimental observations in rabbits were made to investigate the pathological effects of gradually increasing doses of Potassium Antimony Tartrate and in co-operation with Dr. M. N. Andrews observations were made on Fairley's complement fixation test in a series of animals before and after infection.

T. Y. Li and H. Gordon Thompson :

> "The Treatment of Schistosomiasis japonica with Antimony compounds." Trans. *Far East'n Assoc'n of Trop. Med.* 1934, **2**; p. 325-348.

DEPARTMENT OF CLINICAL AND EXPERIMENTAL SURGERY

Gastro-intestinal disorders

The study of appendicitis among the Chinese has been continued by Dr. H. Gordon Thompson, together with some experimental work to endeavour to discover the cause. This work is proceeding.

In association with Dr. P. P. T. Wu investigations of the incidence of Peptic ulcer have been made. The observations thus far point to gastric and duodenal ulcer being much more common among the Chinese than was previously believed to be the case.

In association with Dr. John Gray, some of the surgical complications of parasitic disease have also been investigated particularly those occurring in cases of Filariasis and Schistosomiasis.

J. Gray and H. Gordon Thompson :

> "Some Surgical Complications of Parasitic Disease." Trans. *Far East'n Assoc'n of Trop. Med.* 1934, **2**; p. 941-950.

Urological Diseases

Dr. John Gray has continued his work on Urinary Infections and stone formation. Clinically a series of 31 cases of urinary calculus, 30 of which had definite infections, have been investigated in relation to their bacteriology, the site of the lesion, the cause of the persistence of the infection, the effect of infection on renal function, the relation of the Reaction of the urine to infective processes and the effect on the epithelium of the urinary tract.

Experimentally a series of animal experiments has been carried out in an endeavour to find the conditions under which urinary affections occur. It has been shown that the introduction of organisms either directly into the urinary tract or intravenously will not in most cases lead to infection being established unless the epithelium lining is damaged. It has been shown experimentally that there is no definite relation in rats between the incidence of urinary infections and a Vitamin A deficient stone forming diet, similarly that among rabbits a stone forming diet or an experimentally produced stone has no constant relation to the incidence of infection.

Certain conditions which apparently lead to stone formation have also been experimentally investigated and the effect of variations in blood supply, combined with diets having different proportions of Calcium and Vitamin D content, have been observed. Preliminary work has also been done on the effect of fixation of the kidney and obstruction of the urinary tract.

These experiments are proceeding. So far they have demonstrated that ligature of part of the blood supply of the kidney tends to the deposition of stone. Whether this is due to damage to the nerve supply, or to injury to the epithelium, has yet to be worked out.

A series of experiments to determine the effects of denervation of the kidney, and another series on the effects of urinary obstruction combined with normal or various stone forming diets are proceeding.

Additional experiments have been carried out to determine if increase or decrease of renal blood supply has any effect on the incidence of Renal Tuberculosis, and observations have been made upon the effect of hemisection of the kidney on Renal function, its blood supply and histological appearances.

J. Gray:

" Urinary Tuberculosis." *Chinese Medical Journal*, 1934, **48**; p. 269-280.

J. Gray and S. T. Hsiu :

" Tuberculosis of the Urinary Tract." *British Journal of Urology*, 1934, **6**; p. 357-363.

Surgical Tuberculosis

Surgical Tuberculosis has engaged the attention of Dr. S. T. Hsiu. In the Clinical Unit 34 cases have been under observation with regular blood examinations, but in only three of these was a Bacillæmia demonstrated. The relationship of trauma to the onset of the disease was investigated and the weight bearing treatment in tuberculous disease of the hip and knee was tried in some cases but the numbers were insufficient to allow of any very positive deductions being made.

Experimentally an investigation of the question of tissue reaction in tuberculosis in 70 infected animals has been carried through and a study has been made of giant cell formation. Most of the experimental work has been done in rabbits artificially infected with T.B. It was found that tissues from these animals, examined microscopically, very rarely showed the formation of giant cells, but that 17 out of the 70 developed tubercular lesions in the appendix or ileocœcal region. Why this region of the alimentary tract has a proneness for developing tubercular disease is not yet clear.

Medical Tuberculosis

During 1933 Dr. H. G. Anderson, associate professor of medicine at the West China Union University, Chengtu, held a fellowship in the division for the special study of thoracic tuberculosis. Some of the results of his researches have now been published:

(1) A Test Survey of Intrathoracic Tuberculosis in the Shanghai Region. *C.M.J.*, 1934, **48**; p. 207-220.

(2) The Blood Differential Count in the Prognosis of Tuberculosis. *C. M. J.*, 1934, **48**; p. 228-238.

(3) The Limitations of Laboratory Methods in the Diagnosis of Intrathoracic Tuberculosis. *C. M. J.*, March, 1934, **48**; p. 253-258.

(4) Intra-thoracic Tuberculosis among Chinese. *Tubercle*, 1935, **16**; 6 p. 241-256 and **8**; p. 294-303.

Lymphatic System

Dr. Y. C. Yieh has been associated with Dr. Gray in the observation and treatment of cases of Lymphogranuloma Inguinale, and the latter has also been investigating the lymphatic channels in cases of elephantiasis and chyluria. The injection of Thoratrast and X-Rays have been used in this connection.

John Gray and Y. C. Yieh:

"Lymphogranuloma Inguinale among Chinese." *Chinese Medical Journal*, July, 1934, **48**; p. 607-622.

THE DIVISION OF PHYSIOLOGICAL SCIENCES

PROFESSOR BERNARD E. READ

The Division of Physiological Sciences during 1934 has completed its first year of work in the Institute. The organization of the work during the latter half of 1933 enabled each worker in 1934 to undertake a satisfactory programme following the lines laid down at the start. By personal conferences and group meetings held twice weekly the development of the work has progressed well, with each member participating in an understanding and discussion of all the research underway, and through the Journal Club a detailed knowledge of the work in other laboratories has been sustained. While the volume of published reports is not yet at its maximum, the work has gone on intensively and enthusiastically and will yield more complete results in the future.

DIETARIES

Mr. R. G. Cheng with the assistance of the Senior Chinese technican, Mr. S. C. Wang, completed the inorganic analysis of all the common foodstuffs in use at the Lester Chinese Hospital. These results together with analyses of the organic proximate principles enabled Mr. W. Y. Lee to evaluate the diets of the patients and staff. This was reported before the Institute in a more general survey of " Shanghai Food-stuffs and Diets," by Mr. Lee on January 30, 1935. This mass of data will need further study before publication.

The problem of preparing a substitute for cow's milk in the Chinese infant dietary has engaged the attention of Dr. Eric Reid for the past 18 months. He has successfully prepared a spray-dried powder from soy beans and egg yolk supplemented with sugars and salts, which is free from the objectionable taste and smell of the soya bean. It has satisfactory keeping properties and is perfectly miscible with water. Carefully controlled digestion experiments in vivo in rats and in vitro were undertaken. The nutritive properties of soy bean-egg powder were studied by comparing it with the effect on growth of cow's milk powder, with and without added iron ; in general it produced a more favourable growth response than whole milk powder. The hæmoglobin building properties were found to be quite adequate for the rat, and decidedly superior to whole milk powder. Further studies were undertaken upon the nitrogen and calcium metabolism. Soy bean-egg powder fed to rats and dogs produced bones free from all signs of rickets, and containing a normal percentage of ash.

E. Reid:

"A Preliminary Report on the Preparation of an Infant Food, a Soy bean Milk-egg Powder." *Chinese Journal Physiology* 1934, **8**; 53-64.

E. Reid:

"The Nutritive Properties of Soy bean-egg Powder, a Substitute for Cow's Milk in Infant Dietary." Trans. *Far East. Assn. Trop. Med. 9th Congress*, 1934, **1**; p. 367.

E. Reid:

"The Nutritive Properties of Soy bean-egg Powder, a Substitute for Cow's Milk in Infant Dietary." *Chinese J. Physiol.* 1935, **9**; 27-42.

VITAMINS

With the building up of a rat colony work has been initiated to study the effects of vitamin A deficient diets upon stone formation in the bladder. Diets composed solely of local foodstuffs have been elaborated and tried out successfully, and subsequently used in the biological testing of capsicums and other substances for their content of vitamin A.

The great advances in the chemistry of vitamin C, and in the chemical methods of estimation enabled us to make a rapid chemical survey of 120 Chinese foods and drugs. Hangchow Iris, mustard leaves, willow, tea, white amaranth, Siam pumelo and some of the Brassicas were all found to contain more Vitamin C than oranges or lemons. Dr. Y. F. Chi subsequently extracted on a large scale pure vitamin C from Hangchow iris. These chemical tests have formed a good preliminary study to our biological work under Dr. H. C. Hou, which is being done upon those substances showing a high chemical content of vitamin C. Important observations were made by Dr. Hou upon the relationship of the weight of the adrenal glands to scurvy, there appears to be a definite quantitative relationship, the more severe the scorbutic condition the greater the enlargement of the adrenal.

H. C. Hou:

"A Modification of Sherman and Smith Vitamin A Deficient Ration for Rats." *Chinese J. Physiology* (in press).

H. C. Hou:

"Relationship of Adrenal Weights to Scurvy in Guinea Pigs." Trans. *9th Congress, F.E.A.T.M.* 1934, **2**; 693-708.

H. C. Hou :

"The Vitamin Content of Hunan Capsicum. I Vitamin C, II Vitamin A." *Chinese J. Physiol.*, 1934, **8** ; Soc. Proc. p. 11-13.

"The Vitamin Content of Several Varieties of Chinese Oranges." *Chinese J. Physiol.* 1934, **8** ; Soc. Proc. p. 13.

Y. F. Chi and B. E. Read :

"The Isolation of Vitamin C from Chinese Iris." *J. Chinese Chem. Soc.* 1934, **2** ; 271-273.

Y. F. Chi and B. E. Read :

"The Vitamin C content of Chinese Foods and Drugs." *Chinese J. Physiology* 1935, **9** ; 47-62.

SUGAR METABOLISM

Dr. C. Tsai assisted by a research scholar, Dr. C. L. Yi, has made an intensive study of the carbohydrate metabolism of the liver. Starting with a critical study of methods of determination he set up a procedure for accurately estimating the content of glycogen and other carbohydrates in the liver, then the intake and output of sugar from the liver, and such modifications as occur under anæsthesia. It appears that since the liver gives off more sugar than it takes up even when it is supplied with abundant glucose, that it is still making glycogen from non-carbohydrate sources during glucose absorption. When amytalized, the sugar output does not materially increase, but the amount of glycogen in the liver falls due to partial inhibition in its formation, and the maintenance of a slightly higher blood sugar level is due to a diminution of the peripheral utilization of sugar.

All of this past work has been done on anæsthetized animals, Dr. Tsai has now elaborated a satisfactory technique for a study of this problem under normal conditions. These results will appear later.

C. Tsai :

"The Total Carbohydrate Content of the Liver Tissue in the Fasting Rabbit : A method of Estimation." *Chinese J. Physiol.* 1933, **7** ; 91-102.

C. Tsai :

"Carbohydrate Metabolism of the Liver. I. Glycogen and Other Carbohydrates in Decapitated Cats." *Chinese J. Physiol.* 1933, **7** ; 215-228.

C. Tsai :

"The Question of the Validity of Using Aqueous Extracts for Estimating Glycogen and Total Carbohydrate of the Liver." *Chinese J. Physiol.* 1933, **7** ; 347-352.

C. Tsai and C. L. Yi:

"Carbohydrate Metabolism of the Liver. II. The Sugar Output, as Measured by the Relative Sugar Concentration of the Inflowing and Outflowing Blood." *Chinese J. Physiol.* 1934, **8**; 245-272.

C. Tsai and C. L. Yi:

"Carbohydrate Metabolism of the Liver. III. The Sugar Intake, as Measured by the Relative Concentrations of Sugar in the Inflowing and the Outflowing Blood during Glucose Absorption." *Chinese J. Physiol.* 1934, **8**; 273-296.

C. Tsai and C. L. Yi:

"Carbohydrate Metabolism of the Liver. IV. Sugar Output in Amytalized Cats." *Chinese J. Physiol.* 1934, **8**; 399-410.

Mr. W. Y. Lee studied the metabolic changes in the soy bean during germination. Sugars are consumed in the early stages, but later on fat is used up and the sugar content rises. Later decreases in sugar are correlated with the formation of cellulose.

W. Y. Lee:

"Metabolic Changes of the Soy bean during Germination." *Chinese J. Physiol.* 1934, **8**; Soc. Proc. p. 11.

PHARMACOLOGY

Materia Medica

The tenth edition of "Materia Medica Notes" represents our latest studies upon Chinese drug terminology as it applies to modern medicine in the Chinese Pharmacopœia and the latest edition of the British Pharmacopœia.

With the assistance of Mr. C. M. Yu and Mr. P. S. Chao translations from Chinese sources and the identification of Chinese materials has been made, especially dealing with "Dragon and snake drugs" in old Chinese medicine. By a comparative study of the customs and folklore of other countries in the field of medicine, one further class of drugs has been dealt with, to assist workers in a scientific evaluation of ancient medicine. This evaluation goes hand in hand with the development of modern research. The more recent biological discoveries in the field of hormones, vitamins, glandular and organ extracts rationalizes some of the empirical methods in use in China for many centuries.

Much good work has been done by Mr. Chao in establishing the scientific identity of the food and drugs worked upon in the department. This has been supplemented by the scientific recording of data with coloured illustrations by Mr. Y. C. Su.

B. E. Read:

"Materia Medica Tables and Notes." *Chinese Medical Association Publication.*, 10th edition, 1934, p. 172.

B. E. Read:

"Chinese Materia Medica, Part VII. Dragons and Snakes." *Peking Nat. Hist. Bull.* 1934, **8**; part 4; p. 66.

B. E. Read:

"The Newer Pharmacology and its Relationship to Ancient Medicine." Trans. *9th Congress F.E.A.T.M.* 1934, **2**; 627-638.

Donkey Skin Gelatin

The phenomenally widespread use in China of gelatin prepared from donkey skin, called "Ah-chiao," as a blood regenerator, an internal styptic and as a general nutritive for weak people especially those suffering from tuberculosis, has led to an investigation into its particular character, both chemical and physiological. Dr. T. G. Ni finds that similar to ordinary gelatin it contains a large amount of glycine, also cystine, lysine, arginine, and histidine. Administered orally it improves the calcium and nitrogen absorption, and raises the calcium level of the blood. It is equally effective even when extracted with ether and alcohol to remove any vitamin A that might be present. Orally it does not raise the coagulability of the blood.

Ah-chiao used intravenously was found to be superior to acacia gum in restoring a depressed circulation after hemorrhage and shock. Further work is proceeding upon its beneficial effects in muscular atrophy.

T. G. Ni:

"The Effect of Ass Glue (Ah-chiao) upon Calcium Metabolism and the Coagulability of the Blood. Its Use in the Treatment of Traumatic or Histamine Shock." *Chinese J. Physiol.* 1934, **8**; Soc. Proceed. p. 21-22.

T. G. Ni:

"Factors Related to the Increased Calcium and Nitrogen Absorption Produced by the Chinese Drug Ah-chiao (donkey-skin Gelatin.") Trans. *9th Congress F.E.A.T.M.* 1934, **2**; 645-658.

Ephedrine

Continuation of our work upon ephedrine has been directed toward chemo-therapeutic studies with the hope that a clearer conception of the action of ephedrine-like substances might be obtained, and of the numerous compounds prepared one might be found free from the untoward therapeutic effects of pure ephedrine.

Dr. C. Pak found that the methylated compound is much weaker than ephedrine in its circulatory effect, is less toxic to rabbits and dogs, but it gives good dilatation of the bronchi, and so may be of value in asthma in preference to ephedrine without producing the undesirable side effects of insomnia, palpitations, etc.

Professor S. D. Wilson of Yenching University has provided us with several other preparations. The quaternary compound unlike substances of similar chemical structure did not show any curare like action, and only a weak muscarine like action was observed after the ganglion effects had been eliminated in nicotinized cats. Large doses paralyse the ganglion cells of the autonomic system but the chief effect is seen in mild dosage producing a weak stimulation of the sympathetic ganglion cells, about $\frac{1}{40}$th as strong as tetramethylammonium iodide.

Dr. B. Mukerji made a comparative study of the action of 13 amines, related to ephedrine, upon the smooth muscles of the intestine, uterus, bladder, and bronchioles. He found that as the length of the side chain increases from propanolamine to octanolamine there is a tendency towards an increase in activity. The sympathomimetic activity disappears almost completely with alkaryl or aryl substitutions. The relation of primary to secondary amines varied but conversion of a secondary to a tertiary compound increased the smooth muscle effect.

C. Pak and B. E. Read:

"The Comparative Action of Methylephedrine and Ephedrine." *Chinese J. Physiol.* 1934, **8**; Society Proceedings p. 23.

C. Pak and B. E. Read:

"The Action of Ephedrine Quaternary Halide Compounds." *Chinese J. Physiol.* 1934, **8**; Society Proceedings p. 23. *Chinese J. Physiol.* 1935, **9**; 1-16.

Hydnocarpus

Chaulmoogra salts have been studied for their toxicity effects upon the liver and kidney. Further observations show from a detailed study of the tissues concerned that the kidney actually suffers degeneration of the convoluted tubules and the liver shows varying degrees of fatty infiltration.

B. E. Read:

"Further Observations upon the Effect of Hydnocarpus Preparations upon the Liver and Kidney." *Chinese J. Physiol.* 1934, **8**; Society Proceedings p. 24.

Perilla

Dr. Y. F. Chi completed an earlier research upon the chemistry of Chinese Perilla. He prepared from the leaves an essential oil (0.83%) which yielded a new ketone, B.P. 114-116° under 22 mm. pressure, which when analyzed was shown to have the general formula $C_{11}H_{18}O$. A dark green resin (9.6% of the leaves) yielded phytosterol, various fatty acids, which he identified, and a new alcohol Perillol $C_{28}H_{50}O_2$. A large amount of simple sugar was also present. The reputed diuretic and antipyretic properties of this drug have yet to be tried out.

Y. F. Chi:

"Chemical Examination of Chinese Perilla." *J. Chinese Chem. Soc.* 1934, **2**: 315-328.

SPECIAL PROBLEMS

Amyl Nitrite

The instability and mixed character of the official preparations of amyl nitrite and the improved methods of preparation led Professor S. D. Wilson of Yenching University to attempt the isolation of the pure isomers of amyl nitrite. These four pure compounds have been tried out by us physiologically in comparison with the effects of the official mixture and pure tertiary amyl nitrite on account of its greater volatility, its lower toxicity, and its more constant effects was considered the best product for therapeutic purposes. Most of the work upon this paper was done in Peiping in co-operation with Dr. K. Y. Yu of Mukden and Dr. T. M. P'eng of the P.U.M.C.

B. E. Read, K. Y. Yu and T. M. P'eng:

"A Comparison of the Action of the Isomers of Amyl Nitrite." *Chinese J. Physiol.* 1933, 7; 253-268.

Propyl Guaiacol

Dr. Pyman has introduced to us a new preparation recommended as an anthelmintic. This was studied by Dr. Pak upon dogs and cats and found to be active for ascaris, but it had no effect on tape worms, hook worms or flukes. It was irritant to the alimentary canal and comparatively toxic especially to cats, it is readily absorbed producing a marked depression on the central nervous system and circulation. We are greatly indebted to Dr. Mary Andrews for co-operation in this research.

Pyrimidine Chemistry

With Dr. Chi's expert knowledge of pyrimidine chemistry the China Foundation agreed to send a research fellow, Mr. Y. L. T'ien to work in our laboratories for the academic year 1933-34. Mr. T'ien successfully completed an advanced piece of work upon the molecular rearrangement of 2-ethylmercapto-5-ethyl-6-thiocyanopyrimidine. This has been accepted for publication in the "Journal of the American Chemical Society." We much appreciated the presence of a good organic chemist in our midst, Mr. T'ien entered into the life of the Division quite well, and contributed well to our round table discussions.

Y. F. Chi and Y. L. T'ien :

" Researches on Pyrimidines." *J. Amer. Chem. Soc.* 1935, 57 ; 215-217.

STAFF CHANGES

During the year Dr. Y. F. Chi received a most favourable invitation to the staff of the "Academia Sinica," and Mr. T'ien also joined the staff of that organization. Whilst we miss their good presence with us in our Division, the change of Institution has not meant a change of interest, Dr. Chi will continue and considerably expand his chemical work upon Chinese drugs, and Professor B. E. Read has been appointed one of the advisors to the "Academia Sinica."

We are pleased to welcome Dr. Peter Mar from the University of Manitoba to our midst. Dr. Mar comes with a good record of work in biochemistry. He is initiating studies upon Vitamin A.

Dr. C. Pak left in October for the National Research Institute, Hampstead, to investigate the latest methods of biological standardization. Dr. Pak is the holder of a Holt travelling fellowship, he will return to us later in 1935.

We were delighted to welcome Dr. B. Mukerji from The Tropical School of Medicine, Calcutta, who visited China for one year with a Rockefeller Fellowship. Dr. Mukerji has specialized in pharmacological research upon indigenous drugs in India, and came to China to study our programme and methods, and to learn as much as possible about legislative ways of meeting the difficult situation which exists in India and China with regard to Ancient and Modern Medicine. The excellent research undertaken here by him has already been mentioned. He added much to our discussions and all the staff appreciated his good fellowship.

SERVICES

This Divisional Report will not be complete without some reference to the various special services. It is planned to have in each main laboratory a specially trained technician. Beside the personal training given by each doctor, we have had a weekly technician's class led by Mr. R. G. Cheng, who has covered most of the practical points of a technician's needs in the field of inorganic chemistry. A final examination showed that at least theoretically our technicians have progressed well.

The workshops under Mr. G. Blow have rendered excellent service in glass, metal and wood work. We are indebted to other divisions for a large amount of histological sectioning, photographic work, and X-Ray pictures.

DIVISION OF PATHOLOGICAL SCIENCES

DR. R. CECIL ROBERTSON

The chief activities of this Division have been directed during 1934 to a continuance of the investigation of special problems of research. The subjects may for descriptive purposes be grouped under the main scientific sections of the Division :

(1) Bacteriology and Virus Diseases
(2) Immunology and Serology
(3) Tissue Pathology
(4) Parasitology
(5) Medical Entomology

Certain problems have been undertaken by the staff in more than one section since the above grouping is mainly for the purposes of allocating apparatus and technical services and does not necessarily delineate the activities of a research worker.

(1) BACTERIOLOGY AND VIRUS DISEASES

Studies on B. Typhosus Isolated in Shanghai

This research work has an important bearing on the future treatment of typhoid fever since a very good case seems to be made out for re-trial of an improved curative anti-serum for administration to enteric fever patients.

Dr. H. Yu finds newly isolated strains of B. typhosus vary in their virulence as well as agglutinability to " O " antibody. B. typhosus cultures which are highly agglutinable to " O " antibody are of low or moderate virulence while strains which resist " O " antibody are much more virulent. B. typhosus cultures which are highly agglutinable by " H " immune serum may resist " O " antibody. Vaccines and sera prepared from virulent and " O " antibody resistant strains conferred full protection to experimental animals, while vaccines and sera prepared from highly agglutinable and non-virulent strains were devoid of protective action.

Research upon B. typhosus is of particular interest in view of the work of Felix and Pitt with regard to the demonstration of Vi antigen.

Anti-typhoid vaccine which has been prepared for many years from the classical Rawlings strain is within recent years subject to a complete reorganization of method in its composition and the methods by which its efficacy is tested. We are following these developments closely since what is being done at the Royal Army Medical College Vaccine Department, London, and elsewhere may offer a useful guide to similar vaccine producing institutions in China.

Future lines of investigation which were discussed abroad with various workers consist in attempting to discover the factor in B. typhosus infections which causes Leucopenia.

We have a steady source of Enteric clinical material to work upon in Shanghai at the Lester Hospital and are more favourably placed in this respect than most institutions in Europe or America where typhoid is gradually becoming of infrequent occurrence.

B. Pyocyaneus

An interesting study of the occurrence of this organism in ear infections was made by Dr. H. Yu while the fact that B. pyocyaneus is antigenically very similar to B. proteus X 19 was elucidated.

This latter point was reported by Dr. Robertson at the British Medical Association Conference at Bournemouth in the Section of Tropical Diseases in July 1934.

Local Streptococci Strains in Scarlet Fever

From a study by Dr. H. Yu and Dr. H. Wei of 18 strains of hemolytic streptococci isolated during the acute stages of typical scarlet fever cases in Shanghai, two types of colonies were found which probably correspond to the S and R forms of Cowan or matt and glossy forms of Todd. Morphologically the organisms of the matt type were always larger than those of the glossy type, but they all gave granular growth in broth. There was no correlation between the toxin production and colony formation. From an analysis of 660 cases of Dick tests, there was very little difference between the toxin produced by the local strains of the streptococcus and that of Dick and Dochez strains. There were, however, 13 cases (1.96%) which were negative to the local but positive to the Dick and Dochez toxin, and 20 cases (3.03%) acted in the reverse manner. It is obviously essential that toxin employed for Dick tests should be ot the broadest valency possible. The percentage of positive Dick tests among school children in Shanghai resembled closely the findings in Harbin and Peiping. Should similar results be obtained in other localities, we may then conjecture that the difference in the disease incidence in different parts of China may be due more to climatic influences than to the average susceptibility of the population.

Tuberculosis

Dr. Li Yuan Po has isolated forty strains of Tubercle bacilli from human cases, one strain from a dairy cow and one strain from a pig. These cultures were studied on various media such as that of Besredka, Loewenstein, Petragnam, Petroff and No. 28 of our own which is specially adapted for the isolation of the bacilli from tuberculous material.

Studies were conducted upon the " smooth " form of tubercle bacilli.

Cultural methods were also elaborated for the rapid differentiation of the three types of T.B. A paper was read on this subject at the Congress of the Chinese Medical Association at Nanking in April 1934.

A strain of acid fast tubercle like organism from a human case found non-pathogenic to guinea-pigs and rabbits was investigated.

Cholera

Dr. Pollitzer, microbiologist of the National Quarantine Service, has continued his work in the Cholera Research Laboratory of this Institute. This work has been largely connected with Cholera and Related Vibrios in Shanghai waters. The systematic investigation of regularly collected water samples from the Whangpoo River and the major creeks, as outlined in the preliminary report rendered in March, 1934, was continued. In addition to the methods described therein, ample use is being made now of tests with litmus milk. This is the first time that the behaviour of cholera-like vibrios towards milk has been studied in a systematic manner. The more our studies with this and other methods proceed the clearer it becomes that the different vibrios met with fall into different groups. The extremes are represented by the vibrios usually encountered in the Shanghai waters on the one hand, and the typical cholera vibrios on the other. The other groups stand, as it were, between these two groups. Under these circumstances, it is of great interest that the three cholera strains isolated in the summer of 1934 at the Shanghai Municipal Council Laboratory and kindly put at our disposal did not show the typical behaviour of our cholera stock cultures but were in many respects similar to the water vibrios. The same holds true of a fourth cholera strain isolated in July, 1934, in this

Institute from a Whangpoo River sample. As pointed out in a paper read on this work at the Conference of the F.E.A.T.M. in Nanking in October, 1934, these findings, while not forming proof positive that a transition of cholera-like vibrios into cholera vibrios takes place in nature, under the conditions prevailing at Shanghai, results obtained thus far are compatible with such an idea. It is hoped that the continuation of the work will throw further light upon this problem which is not only most interesting from a theoretical point of view but of the greatest practical importance.

Dr. H. Yu has completed a series of investigations on cholera vaccine. This has formed part of a communication to the Central Cholera Bureau.

During Dr. Robertson's absence on leave Dr. Gear represented the Institute on the Central Cholera Bureau. He attended several meetings and a scheme for determining the presence of endemic foci in the Yangtze valley was elaborated.

Trachoma

Dr. F. F. Tang completed his studies on the etiological factors which may produce Trachoma. He concluded during the year under review his two year's experimental work with B. granulosis and concluded that B. granulosis plays no etiological rôle in Trachoma.

Bacterial Flagella

Dr. H. Wei has produced a new technique for the study of bacterial flagella by means of a transparent fluid which retards their movements thus rendering them easily visible by dark field illumination.

A paper was read at the C.M.A. Conference at Nanking in April, 1934, on this topic. Since which date a new and improved method has been worked out and a paper is in preparation.

Pleuro-pneumonia of Cattle.

One of the most striking features of our investigations in Bacteriology during 1934 has been the work of Dr. F. F. Tang in bovine pleuro-pneumonia. A distinct series of original observations has been made on the growth phases of the virus of pleuro-pneumonia of cattle.

The history of pleuro-pneumonia in China is very obscure. As far as we are aware the first outbreak occurred in 1919, when the disease was discovered in a Shanghai dairy introduced by a shipment of milk cows from Australia. In 1920, Hongkong was also reported to be infected from the same source. In 1931, Shanghai was re-invaded by the disease. A certain dairy had three infected animals amongst a consignment imported from Manchuria through Dairen. From this time on the infection has established itself in this virgin soil. Within a few months after the importation it had spread like a blazing fire, involving thousands of cases. According to the Shanghai Municipal Report, 10.4 per cent of the cattle in the Settlement area died, in 1932, from the disease. Since its introduction, pleuro-pneumonia has become endemic in Shanghai and has gradually invaded neighbouring areas such as Kiangwan, Woosung and Pootung. As the local epizootic offered us an excellent opportunity, we have undertaken an investigation of the virus with the following results :

1. The isolation of the virus of pleuro-pneumonia was effected by ordinary bacteriological technique of plating, dilution and filtration, the last being the most serviceable.

2. The virus could be cultivated aerobically or anærobically in solid, semi-solid and fluid media. Bennett's broth was used as a basic medium in this investigation.

3. After one or two days of incubation in broth, there first appeared usually islands, then threads and finally general cloudiness in the medium. But with heavy inoculum only general cloudiness could be seen, the islands or threads being either not present or too transitory to be observed. With old cultures such as the Lister and German strains we possessed, no matter how small the size of the inoculum, there appeared only general cloudiness.

4. When the cultivation was made with semi-solid medium, colonies of the organism could be observed by darkfield illumination. With an old strain the colony consisted almost exclusively of rings and granules arranged in three zones, the innermost being homogeneous and highly refractile, the middle being full of rings and granules and the outermost being composed of loosely arranged rings and granules.

5. With a fresh strain the appearance of the colony was quite different from that in the old strain with the exception of the central zone which showed similar structure. The middle zone consisted of some rings and granules but mostly filaments and the peripheral zone of long radiating filaments with protoplasmic streaming within them.

6. Similar to the observations summarized under 4, the broth culture of an old laboratory strain also consisted mostly of rings and granules. From the observations made both with semi-solid and fluid media, we conclude that in the old strains the reproduction of the virus is merely by simple budding.

7. In the freshly isolated strains, the development may be described under five stages: (1) the resting stage or Stage of Elementary Bodies—This consisted of rings, granules, a few diplo-coccoids and bacillary bodies. The presence in abundance of these bodies gave rise to general cloudiness of the medium to the naked eye. (2) Filamentous Stage—This consisted of formation of filaments from the dendritic protusions of the elementary bodies. (3) Stage of Ramification—This consisted of branching and sub-branching of filaments. When filaments and branch-filaments congregated, islands and threads were formed. (4) Stage of Chain Formation—This consisted of formation of chains of various types by the consolidation of protoplasm in the filaments. (5) Stage of Disintegration—In this stage the chains were broken up progressively into elementary bodies thus completing the cycle.

8. The virus was bile-soluble, susceptible to ether and capable of fermenting glucose, levulose, maltose, mannose, saccharose, trehalose and dextrin. Fresh cultures reduced hemoglobin. This property of hemoglobin reduction decreased as the age of the culture advanced.

9. Goats and a water-buffalo were found susceptible to experimental inoculation ; whereas mice, hamsters, rabbits, rats, guinea pigs and cats were not.

10. Serologically no distinction could be made out among the different strains studied.

Drs. McWhirter and Edgar, Veterinary surgeons in Shanghai, took an important part in obtaining material from cattle and contributing to the veterinary aspects of the problem.

Glanders

A human case of glanders was studied and a paper on this topic has been accepted for the " Chinese Medical Journal."

Virus Diseases

Work in Progress.—Cultivation of Viruses in Chicken Embryo.

So far we have succeeded in cultivating the virus of vaccinia in the allantoic membrane for six generations. Contrary to the usual belief there seems to be some increase of virulence of the virus as the number of passages is increased. Cytological studies are being made to detect if there are any cell inclusions.

With regard to complement fixation tests in virus infections, we have evidence of a positive reaction with the virus of vaccinia but no evidence so far for rabies and herpes.

Publications

F. F. Tang and H. Wei:

"Studies on the Virus of Pleuro-pneumonia of Cattle." Trans. *Ninth Congress Far East. Assoc. Trop. Med.*, Nanking, 1934, **1**; p. 259-261.

F. F. Tang:

"Recent Progress in the Study of the Etiology of Trachoma." *Chinese Medical Journal*, 1934, **48**; p. 839-846.

F. F. Tang:

"Studies on the Relation of B. granulosis to Trachoma." *Journal of Infectious Diseases* (in the press).

F. F. Tang, S. H. Liu and L. S. Kau:

"A Case of Glanders in Man." *Chinese Medical Journal*, 1935, **49**; p. 248-255.

F. F. Tang and H. Wei with D. L. McWhirter and J. Edgar:

"An Investigation of the Causal Agent of Bovine Pleuro-pneumonia." *Jour. of Pathology and Bacteriology*, 1935, **40**; p. 391-406.

H. Yu and H. Wei:

"Studies on Local Strains of Streptococci in Scarlet Fever." Trans. *Ninth Congress Far East. Assoc. Trop. Med.*, Nanking, 1934, **1**; p. 185-191.

R. C. Robertson and H. Yu:

"The Cholera Carrier Problem in Shanghai." *National Quarantine Service Reports*, Series IV.

H. Yu:

"A Case of Mixed Infection of B. typhosus and B. paratyphoid B." *Chinese Medical Journal*, 1934, **20**; p. 503-504 (Chinese Section).

R. Pollitzer:

"Cholera and Related Vibrios in Shanghai Waters." *National Quarantine Reports*, Series IV.

R. Pollitzer:

"The Behaviour of Cholera and Cholera-like Vibrios Towards Blood and Milk Media." Trans. *Ninth Congress Far East. Assoc. Trop. Med.*, Nanking, 1934, **1**; p. 411-419.

(2) IMMUNOLOGY AND SEROLOGY

The chief subject matter of research in pure serology as such has been with respect to the serodiagnosis of syphilis. This technique has been performed with a service object in view, as during 1934, all Wassermann and Kahn tests required at the Lester Chinese Hospital have been performed here. Special attention was paid to the influence of high and low temperatures upon the results of flocculation tests (Kahn and Sachs-Witebsky). A report on this subject appears in the Transactions of the F.E.A.T.M. Nanking Congress, 1934.

Comparison experiments are in progress with various antigens such as brain antigen versus heart muscle antigen.

Complement fixation tests in connection with Schistosomiasis have been studied. This subject is commented upon under Helminthology.

Precipitation tests for the differentiation of blood engorged by anopheline mosquitoes are on hand. This matter is commented upon under Entomology.

Blood Grouping

Shanghai is an ideal centre for a study of this kind as Chinese from every province in China are to be found here.

We commenced collecting data at the beginning of 1932 and up to date the staff of the serological laboratory have accomplished over ten thousand tests. A study of the distribution of blood groups among the Chinese population based on these observations is in course of preparation.

The distribution of " M " and " N " elements (Landsteiner and Levin) amongst Chinese is also being studied. 300 observations have been made during 1934.

Dr. K. C. Mak, during the tenure of his scholarship in 1934, performed a short study of the inheritance of " M " and " N " properties amongst Chinese children. The series is small, 47 children, but the work is of considerable interest.

Publications

Li Yuan Po :

" The Influence of High Temperature (56°C.) and Low Temperature (6°C.-8°C.) upon the Flocculates of Flocculation Tests of Syphilis." Trans. *Far East. Assoc. Trop. Med.*, Nanking, 1934, **2** ; p. 619-626.

(3) TISSUE PATHOLOGY

Dr. L. S. Kau continued his Research Fellowship during 1934 and was placed in charge of the laboratory of tissue pathology including technical services in connection with section cutting and morbid anatomy. In order to obtain pathological tissues for research purposes and on account of the scarcity of morbid material from the Lester Hospital an arrangement has been made with numerous other hospitals throughout China for the submission of tissues of research interest. This scheme has resulted in the Institute being regarded as a diagnostic laboratory in difficult cases of tissue pathology especially when malignant or neoplastic growths are suspected. A large amount of material has passed through our hands. Much of this is of scant interest from a pure research standpoint. However, it is of the greatest value from the statistical aspect as the facts regarding the incidence of neoplastic diseases amongst the Chinese have hitherto only received the most superficial investigation. With this general object in view, we have offered considerable facilities in section preparation and report to those hospitals which have co-operated in the Institute's statistical survey. It is possible that this entire scheme will require modification in the near future and only specific subjects receive investigation at the Institute.

It is, however, very difficult to get hospitals to submit only material of interest to us unless they receive a considerable service along general diagnostic lines in return. During 1934, 1,391 specimens were reported on and the volume of section cutting showed a threefold increase from the previous year. The section-cutting laboratory was of very considerable service to other departments of the Institute. Large numbers of preparations were decalcified and sections made in connection with Vitamin research in the Division of Physiological Sciences.

Tissue Culture

A commencement has been made with this work but in the first instance and until our technical methods are perfected we are confining ourselves to the study of the normal cytological changes of cells in culture.

(4) PARASITOLOGY

(*a*) *Protozoology*

Dr. M. N. Andrews reported a case of canine Kala-azar during the year under review. This is the first authenticated case reported in China.

Publications

M. N. Andrews:
"A Case of Canine Kala-azar Occurring in China." Trans. *Ninth Cong. Far East. Assoc. Trop. Med.*, Nanking, 1934. **1**; p. 679-684.

(*b*) *Helminthology*

A continuance of the collection of Helminths found in domestic animals in Shanghai has been pursued during 1934. Parasites from over 600 animals have been studied and classified. Many of these specimens have been distributed to institutions in Europe and America.

Schistosomiasis Japonica.—The complement fixation test in this disease has been studied and further work done in the preparation of our own antigen from both cercariæ and the adult worm. With a view to elucidating whether this reaction is a group phenomenon or not we have prepared antigens from Fasciola hepatica and Clonorchis sinensis.

Field Work.—This has been limited in extent owing to the absence of the Head of the Division on long leave. Dr. Andrews paid a visit to Chinkiang and cleared up the etiology of certain cases of Schistosomiasis occurring among sailors on H.M.S. "Falcon" and among the local Chinese garrison. The exceptionally hot and dry summer affected the molluscan intermediate host and little material was available. Studies of the bionomics of Oncomelania hupensis were temporarily suspended.

A commencement has been made with determining the hydrogen ion concentration of soil samples, but this work will be continued over a further period as it is only one factor affecting the life of the molluscan host.

Publications

M. N. Andrews:
"The Examination of Faeces for the Ova of Schistosoma Japonicum." *Chinese Medical Journal*, 1935, **49**; p. 42-46.

M. N. Andrews:
"Complement Fixation in Schistosomiasis using Cercarial Antigen Prepared from Oncomelania Hupensis." *Journal of Helminthology*, 1935, **13**; p. 25-40.

R. C. Robertson:
"Schistosomiasis in the Shanghai Area." *China Journal*, 1933, **19**; No. 1; p. 28-37.

(5) MEDICAL ENTOMOLOGY

The programme of entomological researches during the past year was carried on along two main lines: (*A*) Laboratory studies on filarial transmission and (*B*) Field studies on the bionomics of mosquitoes.

(*A*) *Laboratory Studies on Filarial Transmission*

1. The local species of mosquitoes were experimentally infected on filarial patients to ascertain their susceptibility to infection with Wuchereria bancrofti.

The following three species of mosquito were experimentally infected with filaria and found not to be hosts:

Aedes albopictus Skuse
Aedes vexans var. nipponii Theobald
Armigeres obturbans Walker

In Aedes albopictus and Aedes vexans, the microfilariæ were found to die soon after having penetrated into the body cavity of the mosquito. In Armigeres obturbans, the filariæ were able to develop only partially to the intermediate sausage stage, after which, they all died in their mosquito host.

The following five local species of mosquito were found to be able to serve as hosts to the filaria.

Culex pipiens var. pallens Coquillet
Culex vagans Wiedemann
Culex tritæniorhynchus Giles
Lutzia fuscana Wiedemann
Anopheles hyrcanus var. sinensis Wiedemann

Culex pipiens var. pallens was found to be the best carrier of filariasis in the Shanghai region. Next in susceptibility to experimental infection with filariæ was Anopheles hyrcanus sinensis. In only a small percentage of Culex tritæniorhynchus were the filariæ found to be able to develop to the infective stage. Two new susceptible mosquito hosts for Wuchereria bancrofti were found during the course of our study, namely, Culex vagans and Lutzia fuscana.

2. Laboratory studies were undertaken on problems which have a general bearing on the epidemiology of filariasis. Some of them under investigation during the past months were as follows:

(*a*) The longevity of the filarial larvæ in their mosquito host after they have completed development to the infective stage. Data obtained from a series of Culex pipiens infected during September indicates that the infective filarial larvæ can live for more than 79 days in this mosquito host, in addition to an incubation period of 14 days. The mosquito host may thus be infective to man for quite a considerable length of time.

(*b*) The reaction of the mosquito host to the filarial larvæ they harboured was investigated. An interesting phase of this reaction consisted in the chitinous encapsulation of a certain number of the filarial larvæ by some of these mosquitoes. In Aedes vexans, all the micro-filariæ are chitinized soon after they have penetrated into the body cavity of their mosquito host. In Armigeres obturbans, some of the filarial larvæ are chitinized after they have developed for several days to the intermediate sausage stage while in Lutzia fuscana, some of the filarial larvæ are encapsulated by the chitinous covering after they have completed their growth to the infective stage. The mechanism of this protective reaction on the part of the mosquito to this form of parasitic invasion is under investigation.

(*c*) The influence of climatic conditions on the development of the filarial larvæ in Culex pipiens was studied. During the hot summer weather of the past year, the parasites were not able to develop to normal infective larvæ in their mosquito hosts. The degree of susceptibility of Culex pipiens was found to vary considerably at the different seasons of the year.

(*B*) *Field Studies on Mosquito Bionomics*

1. Data on the types of breeding places of the 15 species of mosquitoes found in our field area at Kaochiao were obtained.

2. The breeding season of each of these local mosquitoes was ascertained for the past year.

3. The comparative rôle which each type of breeding place plays in the production of anopheline larvæ was ascertained. The main source of Anopheles in our study area during the past year was found to be the rice paddies. The creeks ranked second in importance as an anopheline breeding place. These findings are based on a quantitative basis in terms of the relative larval density index of each type of water.

4. Data on the relation of Anopheles breeding to rainfall and water temperature were obtained.

5. The breeding of our local Anopheles was found to be mainly in water showing a neutral or alkaline reaction. Water below pH 7.0 was found inhibitive for anopheline breeding during the past season.

6. From data collected in our man-baited trap and in the village houses of our study area during the past year, only five of the 15 local species of mosquitoes were of importance as household species. The remaining species were not found in houses so often.

7. The relative abundance of the adults of these five domestic species was ascertained for the year.

8. Data were obtained on the seasonal density throughout the past year of the above-mentioned household species, namely, Anopheles hyrcanus var. sinensis, Culex pipiens var. pallens, Culex tritæniorhynchus, Aedes albopictus and Armigeres obturbans.

9. A study on the turn-over of Anopheles adults in houses was started during this past season. This was done by staining the adult mosquitoes which entered selected rooms and making collections in these rooms afterwards at intervals of a different number of days.

10. The zoophilism of our local Anopheles was studied. From weekly collections of all the Anopheles in a cow-shed, pig-sty and human habitation, it was found that animal sheds attract many times more Anopheles than human habitations.

11. A joint study was carried on with Dr. Toumanoff of the Pasteur Institute of Saigon on the blood preference of our local Anopheles. It was found that Anopheles hyrcanus sinensis will readily feed on cows. A continuation of this study on a wider scale is projected with the use of precipitin sera for the discovery of the origin of the blood found in engorged anophelines.

Publications

R. C. Robertson, S. M. K. Hu and R. V. Dent:

"Mosquito Control: An Entomological Field Station for Mosquito Study in the Shanghai District." *China Journal*, 1934, **20**; No. 6; p. 344-356.

C. H. Yen:

"Notes on the Periodicity of Wuchereria bancrofti Cobbold in Shanghai Region." *Lingnan Science Journal*, 1934, **13**; No. 4; p. 607-613.

C. Toumanoff and S. M. K. Hu:

"Premières Données sur la Zoophilie de A. Hyrcanus var. Sinensis en Chine (Région de Shanghai)." *Bulletin de la Société de Pathologie Exotique*, 1934, **37**; No. 8; p. 741-744.

S. M. K. Hu:

"An Examination of Prisoners at Paoshan, Kiangsu Province, for Microfilariæ of Wuchereria bancrofti Cobbold." *Chinese Medical Journal*, 1934, **38**; p. 1143-1145.

S. M. K. Hu:

"Experimental Infection of Culex fatigans Weidemann from Foochow, Fukien Province, with Wuchereria bancrofti Cobbold." *Lingnan Science Journal*, 1935, **14**; No. 1; p. 87-92.

S. M. K. Hu and C. H. Yen:

"Studies on the Comparative Susceptibility of Culex pipiens var. pallens Coquillet and Culex fatigans Weidemann to Experimental Infection with Wuchereria bancrofti Cobbold." Trans. *Ninth Cong. Far East. Assoc. Trop. Med.*, Nanking, 1934, **1**; p. 483-490.

Photographic Department

Mr. R. V. Dent was appointed on a full time basis as Associate in Scientific Photography in August, 1934.

Great improvement in the technique of Photomicrography has resulted and the Institute's illustrations of the various scientific papers issued are of a standard equivalent to those produced in Institutes abroad.

The Photographic Laboratory has been of great service to the Institute as a whole and the general excellence of the photography performed has been widely commented upon.

Cinematography

This method of illustrating a complete disease problem was commenced during 1933 and in the first instance a film on Field and Laboratory work in connection with Schistosomiasis in the Shanghai region was produced. During 1934 this film was shown at the following institutions:

University of Pennsylvania, Philadelphia
The Royal Society of Medicine, London
The Royal Society of Tropical Medicine, Edinburgh
The University of Glasgow, Glasgow
The Liverpool School of Tropical Medicine, Liverpool
The Royal Army Medical College, London

A film on Filariasis was produced during the spring of 1934. This film will be added to and further work on it is in hand.

Publications

R. V. Dent:

"Length-ways Markings on Leica Films." *British Journal of Photography*, 1934, p. 483-484.

"Altering Contrasts by Varying Printing-Light Intensity." *British Journal of Photography*, 1935, **82**; p. 181-182.

APPENDIX I

LIST OF PUBLICATIONS BY THE STAFF OF THE INSTITUTE PREVIOUS TO THIS REPORT

DIRECTORATE

H. G. Earle:

"The Institute of Medical Research, Its Origin, Nature and Functions." *Nat. Med. J. of China*, 1930, **16**; p. 267-280.

P. G. Edge:

"Statistics and Medical Research." *C.M.J.*, 1932, **46**; p. 1071.

H. S. Gear:

"Epidemiological Survey of Hospital Patients." Interim Report. *C.M.J.*, 1933, **47**; p. 864-876.

"The Papworth Village Settlement for the Tuberculous. Its Interest for China." *C.M.J.*, 1933, **47**; p. 805-812.

"Some Notes on English Medical and Vital Statistical History." *C.M.J.*, 1933, **47**; p. 1040-1051.

"A Landmark in Chinese Medicine." *S. African Med. J.*, 1932, **6**; p. 822.

J. L. Maxwell:

"Classification of Diseases in Hospital Reports." *C.M.J.*, 1930, **44**; p. 327-339.

"Collective Investigation." *C.M.J.*, 1930, **44**; p. 423-428.

"Notes on the Incidence of Leprosy in less Known Areas." *C.M.J.*, 1931, **45**; p. 875-876.

"Leprosy in China." *C.M.J.*, 1933, **47**; p. 227-232.

"Paragonimiasis in China." *C.M.J.*, 1931, **45**; p. 43-49.

et al "The Nosu Tribes of West Szechwan." *Supplement to C.M.J.*, 1933, **47**; p. 34-47.

Printed Separately:

National Medical Journal of China, Index Vols. 1-17, 1915-31.
Chinese Imperial Customs Medical Reports, Index 1871-1900.

DIVISION OF CLINICAL RESEARCH AND EXPERIMENTAL SURGERY

S. Y. Gin:

"Report of a Case of Aortic Aneurysm." *C.M.J.*, 1933, **47**; p. 920.

J. Gray:

"Some Problems in the Pathology of non-Tuberculous Infections of the Urinary Tract." *C.M.J.*, 1933, **47**; p. 637-651.

"Some Observations on Urinary Infections Associated with Senile Enlargement of the Prostrate Gland." *Br. J. Urology*, 1932, **4**; p. 232-240.

J. Gray and M. N. Andrews:
"Entamœba Histolytica and Trichomonas Hominis in Liver Abscess." *C.M.J.*, 1932, **46**; p. 902.

B. S. Platt and S. Dickenson:
"The Technique of Glass Electrode Measurements." *Biochem. J.* 1933, **27**, **4**; p. 1069-1077.

B. S. Platt and H. G. Garland:
"Gastromegaly in Children." *Archives of Diseases in Childhood*, 1933, **8**; p. 211-214.

S. Dickenson, R. E. Havard and B. S. Platt:
"The Measurement of the Hydrogen Ion Concentration of Blood, by the Glass Electrode." *Proc. Physiol. Soc.*, 1933, **78**; p. 28-30.

DIVISION OF PHYSIOLOGICAL SCIENCES

C. T. Feng and B. E. Read:
"Qualitative Tests for Ephedrine and its Derivatives." *J. Amer. Pharmaceut. Assn.*, 1933, **22**; p. 1241-1245.

C. Pak and B. E. Read:
"Action of Ephedrine on the Portal Circulation." *Chinese J. Physiology*, 1933, **7**; p. 199-214.

C. Pak and T. K. Tang:
"The Mechanism of the Mydriatic Action of Ephedrine." *Chinese J. Physiology*, 1933, **7**; p. 229-242.

T. M. P'eng and K. Y. Yu:
"A Comparison of the Action of the Isomers of Amyl Nitrite." *Chinese J. Physiology*, 1933, **7**; p. 253-268.

B. E. Read:
"The Toxicity of Sodium Hydnocarpate." *Int'nl. J. Leprosy*, 1933, **1**; p. 293-307.

B. E. Read and C. T. Feng:
"Qualitative Tests for Ephedrine and its Derivatives." *J. Amer. Pharmaceut. Assn.*, 1933, **22**; p. 1241-1245.

B. E. Read and C. Pak:
"Action of Ephedrine on the Portal Circulation." *Chinese J. Physiology*, 1933, **7**; p. 199-214.

T. K. Tang and C. Pak:
"The Mechanism of the Mydriatic Action of Ephedrine." *Chinese J. Physiology*, 1933, **7**; p. 229-242.

C. Tsai:
"Carbohydrate Metabolism of the Liver I. Glycogen and other Carbohydrates in Decapitated Cats." *Chinese J. Physiology*, 1933, **7**; p. 215-228.

K. Y. Yu and T. M. P'eng:
"A Comparison of the Action of the Isomers of Amyl Nitrite." *Chinese J. Physiology*, 1933, **7**; p. 253-268.

Division of Pathological Sciences

M. N. Andrews:

- "A Simple Method of Staining Protozoa in Fæcal Films." *C.M.J.*, 1932, **46**; p. 476-477.
- "Note on the Treatment of Sub-tertian Malaria P. falciparum with quino-Plasmoquine." *C.M.J.*, 1932, **46**; p. 601-602.
- "Phyllodistomum in Shrimps." *C.M.J.*, 1933, **47**; p. 813-815.
- "The Incidence of Intestinal Parasites in the Wuhan Area." *C.M.J.*, 1933, **47**; p. 390-396.

M. N. Andrews and J. Gray:

- "Entamœba Histolytica and Trichomonas hominis in Liver Abscess." *C.M.J.*, 1932, **46**; p. 902-904.

S. M. K. Hu and T. L. Chang:

- "Observations on Natural Infection of *Culex pipiens* Linnæus var. pallens Coquillet with Wuchereria bancrofti Cobbold in Woosung District, Shanghai, China." *C.M.J.*, 1933, **47**; p. 1367-1372.

S. M. K. Hu and C. H. Yen:

- "Studies on the Susceptibility of Culex pipiens Linnæous var. pallens coquillet to Infection with Wuchereria bancrofti Cobbold in Shanghai Area." *C.M.J.*, 1933, **47**; p. 1359-1366.

Y. P. Li:

- "New Method for the Cultivation of Spirochæta recurrentis." *Kitasato Archives of Experimental Medicine*, 1933, **10**; p. 78-86.

R. C. Robertson:

- "Value of a Hospital Ship in Flood Relief Work." *C.M.J.*, 1932, **46**; p. 560-574.
- "Relapsing Fever in Shanghai." *C.M.J.*, 1932, **46**; p. 853-885.

Appendix II

Lecture Programme 1933-34

Dr. H. G. Earle:
"The Organization of Medical Research."

Dr. B. E. Read:
"Ancient Medicine in China."

Dr. F. F. Tang:
"Recent Progress in the Study of Trachoma."

Dr. H. G. Anderson:
"The Blood Differential Count in Prognosis of Tuberculosis."

Dr. Stephen Hu:
" Studies on Transmission of Filariasis."

Dr. B. S. Platt:
" Some Intimate Aspects of Modern Research in Medicine."

Dr. H. C. Hou:
" Recent Advance in our Knowledge of Vitamins."

Mr. A. de C. Sowerby:
" Chinese Rodents and Lagomorphs."

Dr. H. S. Gear:
" Epidemiological Approach to the Study of Disease."

Dr. C. Tsai:
" Recent Advances in the Study of Carbohydrate Metabolism of the Liver."

Dr. J. Gray:
" Methods of Investigation used in Urinary Tract Disease."

Dr. L. S. Kau:
" Concerning the Mechanism of Focal Infection."

Dr. R. C. Robertson:
" Field Work in Connection with Research upon Schistosomiasis."

Dr. J. L. Maxwell:
" Modern Progress in the Treatment of Leprosy."

Dr. E. Reid:
" Recent Advances in the Knowledge of Calcium and Phosphorus Metabolism."

Dr. W. S. New:
" Orthopædic Surgery in China."

Dr. H. Yu:
" The Development of Our Knowledge of Dissociation of Bacteria."

Dr. C. Pak, Dr. B. E. Read:
" History of Ephedrine."

Dr. S. T. Hsiu:
" The Study of Tuberculosis from a Surgical Point of View."

Mr. F. G. C. Walker:
" Gleanings from the Note Book of a Public Analyst."

Dr. M. N. Andrews:
" Immunity in Parasitic Infections."

Dr. Y. F. Chi:
" Chemistry of Vitamins."

Dr. Gordon Thompson:
" The Comparative Anatomy of the Vermiform Appendix."

Dr. H. W. Miller:
" The Surgical Treatment of Diseases of the Thyroid Gland."

Dr. Y. P. Li:
" Recent Advances in the Study of Tubercle Bacilli."

LECTURE PROGRAMME 1934-35

Dr. H. W. Wade:
Editor, "International Journal of Leprosy"—"Types of Leprosy: The Importance of Classification."

Dr. L. E. Napier:
Calcutta School of Tropical Medicine—"Clinical Aspects of Kala-azar with special reference to Post Kala-azar dermal leishmaniasis."

Dr. F. F. Tang:
"Recent Advances in the Study of Filtrable Viruses."

Dr. John Gray:
"Calculus Formation in the Urinary Tract."

Dr. Eric Reid:
"Mineral Salts in Relation to Health and Disease."

Dr. Wu Lien-teh:
"Joint Efforts in Disease Prevention in Shanghai."

Dr. H. Yu:
"Streptococci in Scarlet Fever."

Miss G. D. Lu and Dr. B. S. Platt:
"Chemical and Clinical Aspects of Muscle Metabolism."

Dr. B. Mukerji:
"Indian Medicine and the Need for Research therein."

Dr. E. H. Hume:
"On Certain Trends in Medicine To-day."

Dr. Stephen Hu:
"Field Studies on the Bionomics of the Mosquito."

Dr. P. P. T. Wu:
"Experimental Kidney Transplantation."

Dr. H. C. Hou:
"The Relationship of Vitamin A to Health and Disease."

Dr. J. L. H. Paterson:
"Basic Ideals in Hospital Practice."

Dr. J. L. Maxwell:
"The Distribution of Disease in China."

Dr. M. N. Andrews:
"Parasites of the Domestic Animals in the Shanghai Region."

Mr. W. Y. Lee:
"Shanghai Food Stuffs and Diets."

Dr. F. C. Yen:
"Recent Developments of Medical Education in China."

Dr. R. C. Robertson:
"The Typhus Fevers."

Dr. B. S. Platt:
"Rice and its Relation to Disease."

Dr. C. Tsai:
"The Constancy of the Internal Environment of a Normal Man."

Dr. L. S. Kau:
"Studies on Tissue Culture."

Dr. H. Gordon Thompson:
"Surgery in Relation to the Endocrine Glands."

Dr. B. E. Read:
"Chaulmoogra."

Dr. Y. P. Li:
"Recent Advances in the Study of Tubercle Bacilli."

Dr. R. V. Dent:
"Recent Advances in Scientific Photography."

Dr. H. G. Earle:
"The Work of the Institute."

APPENDIX III

LIBRARY

Presentations and Additions to the Library During 1934:

	Purchased	*Presented*	*Total*
Books	143	14	157
Journals (Bound Volumes)	442	40	482
Pamphlets	13	24	37

At the Close of 1934 the Library Contained the Following Works:

Reference books and Text books	1,125
Journals, bound volumes	2,011
Monographs from Research Institutes	96
Annual Reports and Year Books	87
Pamphlets	280
Current journals and periodicals	152

Reprint Library:

Each Division maintains its own reprint collection.

Books and Journals Lent to Readers:

Books	*Journals*	*Total*
1,480	994	2,474

Inter-Library Loans:

	Books	*Journals*	*Total*
Borrowed	—	45	45
Lent	1	46	47

Number of Persons Using the Library:

	1933	*1934*		*1933*	*1934*
January	161	203	July	210	294
February	192	325	August	240	201
March	237	268	September.. ..	270	457
April	250	359	October	372	429
May	270	331	November ..	395	447
June	205	302	December ..	410	491
				3,212	4,107

Total 1934	4,107
Monthly average	342

APPENDIX IV

DIVISIONAL CO-OPERATION AND SERVICES

The function of the Directorate is to control services which are required by all Divisions, but each Division, having regard to its special facilities, also controls services for the benefit of other Divisions.

The Division of Clinical Research and Experimental Surgery through its control of beds within the Lester Hospital renders a service to the whole Institute, by supplying the other Divisions with material not only for examination but also for investigation. In its Department of Experimental Surgery, at the Institute, a suite of rooms is provided for the conduct of experimental work on animals under hospital conditions. In addition, the Division has an X-Ray plant installed both at the Hospital and at the Institute and so provides services in Radiology.

The Division of Physiological Sciences maintains laboratory workshops in the basement where apparatus can be repaired and new apparatus made for special purposes; while the Head of the Division by his general supervision of the Animal House renders a service, through the Directorate, to all Divisions.

The Division of Pathological Sciences provides services in clinical bacteriology, serology, parasitology, tissue pathology, and the preparation of media for bacteriological work. The Division also maintains a standard collection of stock cultures.

The Photographic Laboratory, with a full-time associate in Scientific Photography, is proving a fundamental asset to the research work in all Divisions. It is equipped for cinematographic pictures of living organisms, photomicrography, clinical and other photography, both in colour and monochrome.

The Department of Medical Statistics, in addition to epidemiological researches already in hand, is organized to assist other Divisions in the statistical presentation of their data and to apply statistical methods to the elucidation of particular research problems.

MEDICAL DEPARTMENT LABORATORIES.—In addition to the research work of the Medical department, reports on routine examination of specimens have also been supplied to the Surgical research department and to the Lester Chinese Hospital. The numbers are given below:

Type of Examination	*Number for Med. Dept.*	*Number for Surg. Dept.*	*Number for Hospital*	*Total*
Blood for Cytological Examination	911	292	19	1,222
Blood for Chemical Examination	112	48	90	250
Urine for Cytological Examination	677	573	3	1,253
Urine for Chemical Examination	43	11	29	83
Cerebro-spinal fluid for Chemical and Cytological Exam.	109	4	33	146
Gastric juice for Fractional analysis	58	11	—	69
Smears for Parasitological and Bacteriological Examination	46	37	—	83
Sputum, Stool, Pus, Swab. and Serum for Examination	179	29	1	209
Pleuritic, Hydrocele, Ascitic Fluid for Examination	2	5	1	8
Total	2,137	1,010	176	3,323

SURGICAL DEPARTMENT LABORATORY.—In the Surgical laboratory, under Mr. Henderson's supervision, a total of 1,394 specimens were microscopically examined during 1934. Of these 1,256 were in connection with research work either in our own or other Divisions of the Institute's activities, 138 were specimens from Clinical cases either in our own research wards or from other cases in the general part of the hospital.

OPERATION THEATRE.—The animal operation Theatre at the Institute has been fully used during the year 1934, not only by the Division's own workers in Experimental Surgery but also by the workers in the Division of Physiological Sciences. Altogether 874 operations under general anæsthesia have been performed.

X-Ray and Clinical Photography.—Towards the end of 1934—and pending the arrival of the permanent installation, a temporary X-Ray apparatus for animal work was installed in the Institute under the care of Miss O. Barton, and an X-Ray service for the Institute was commenced. Up to the end of the year a total of 135 animal X-Ray pictures was recorded. The X-Ray apparatus at the Hospital, having been moved down to the second floor, the room vacated was adapted to be a studio for the Photography of the various pathological conditions occurring in patients. Mr. Bao has had charge of this under the general supervision of Mr. Dent.

Workshops.—The physiological workshops during 1934 executed 284 orders, of which 75 were for Division I and 23 for Division III. Fifty-five per cent of the orders were for new apparatus, the remaining 45 per cent were for repairs in glass apparatus and various small wood and metal parts.

The outstanding work of the year was the designing and making of an epidiascope for kymograph record projection, and a complete heart lung perfusion apparatus. The largest repair job was on a large cast iron patent water still which had cracked as a result of the sudden accumulation of salts last February when the water supply was abnormally saline.

The general equipment of the workshops is in first class condition with no breakages.

Chemical Rooms.—The following services were rendered to Division I:

1. 19 lots of 9 litres each (171 litres) of used alcohol for redistillation and recovery of absolute alcohol.
2. 54 lots of distilled water, a total of 691 litres.
3. 4.3 grams of creatinine zinc chloride prepared from urine.
4. Analyses of various samples of fluid from rabbit's appendices for amylase, cholesterol, etc.
5. 10 lbs of Soy bean-egg powder for infant feeding.

From various sources, about 20 analyses were made by special request, including two samples of water; dog biscuits, dried blood and tankage from S.M.C.; restandardization of a Hellige comparator for the Lester Hospital, etc.

Materia Medica.—Identification of materials sent in, included non-poisonous snakes from the Lester Hospital and from Division III, diarrhœa grass from Fukien, leprosy drugs from Hainan, tallow tree berries from Szechwan, etc., and numerous enquiries involving bibliographic research were dealt with, from the British Museum, British Consulate, Canadian Church Mission, Chinese National Health Administration, Amsterdam Laboratories, Yale, Moscow, Glasgow, etc., mostly referring to Chinese drugs.

Clinical Bacteriological Laboratory:

Autogenous Vaccine			7
Blood	Widal Reaction	Positive	110
		Negative	111
	Weil-Felix	Positive	2
Blood Cultures	B. typhosus found		44
	Staphylococcus and Streptococcus		31
	B. coli		1
	Paratyphoid " A "		2
	No growth		102

Ascitic, Pleural, Joint and Spinal Fluid		
	Paratyphoid C.	1
	Pneumococcus	2
	Gonococcus	1
	B. Proteus	1
	Streptococcus and Staphylococcus	13
	No growth	77
Pus	Streptococcus and Staphylococcus	166
	T.B. positive	10
	B. coli	9
	B. tetanus	1
	Pneumococcus	1
	B. morgan I	1
	B. pyocyaneus	1
	No growth and T.B. not found	22
Stool	Occult blood	3
	Late Lactose fermenting type B. coli	17
	B. typhosus	11
	Paratyphoid " A "	2
	B. Dys. Shiga	1
	Flexner	10
	T.B. positive	7
	negative	9
	B. morgan I	10
	B. pyocyaneus	1
	No growth	354
Sputum	Streptococcus and Staphylococcus	8
	Pneumococcus	1
Throat Swab	B. diphtheria	3
	Streptococcus and Staphylococcus	42
	Vincent spirochætes and streptococcus	1
Urine	B. coli	176
	Streptococcus and Staphylococcus	92
	B. subtilis	6
	Paratyphoid	16
	T.B.	16
	B. pyocyaneus	3
	Morgan I	3
	B. proteus	6
	No growth	126
Vaginal Swab	Streptococcus and Staphylococcus	7
	B. coli	2
Water, Milk, etc.	for Bacteriological examination	21

The above-mentioned examinations were performed for the Lester Chinese Hospital as a whole including the Clinical Unit.

SEROLOGICAL LABORATORY:

A total of 4,210 specimens of blood serum were examined for the Lester Chinese Hospital and Clinical Unit.

The Wassermann Reaction	Positive	2,305
	Negative	1,915
The Kahn Test for Syphilis	Positive	2,191
	Negative	1,919
The Kline Test for Syphilis	Positive	185
	Negative	142

Blood Grouping was performed in 3,040 cases.

PARASITOLOGICAL LABORATORY:

A total number of 1,460 routine and service examinations were made:

Lester Chinese Hospital	187
Clinical Unit	766
Other cases	26

With regard to the routine stool examinations the following were the positive findings for parasites:

Entamœba histolytica	(free forms)	4
	cysts	18
Entamœba coli	(free forms)	8
	cysts	66
Entamœba nana	(free forms)	6
	cysts	34
Iodine cysts		13
Giardia cysts		19
Trichomonas		16
Chilomastix	(free forms)	2
	cysts	3
Blastocysts		97
Tricercomonas cysts		1
Ascaris ova		163
Hookworm ova		141
Trichuris ova		167
Oxyuris ova		2
Trichostrongylus ova		1
Clonorcis sinensis ova		6
Fasciolopsis buski ova		9
Schistosoma japonicum ova		24
Dicrocœlium ova		1
Charcot Leyden crystals		2

Adult Worms:

Ascaris	24
Necator americanus	27
Ancylostoma	21
Fasciolopsis buski	5
Oxyuris	2

Tissue Pathology Laboratory :

This laboratory received 1,391 biopsy specimens for examination from the following main sources :

Division of Physiological Sciences	637
Parasitological Laboratory	60
Bacteriological Laboratory	68
Serological Laboratory	37
Tissue Pathology Laboratory	24
St. Luke's Hospital, Shanghai	162
Lester Chinese Hospital	180
St. Elizabeth's Hospital, Shanghai	31
Elizabeth Blake Hospital, Soochow	9
Soochow Hospital, Soochow	13
Changchow General Hospital, Changchow	4
Goldsby King Memorial Hospital, Chinkiang	37
E.P. Mission Hospital, Swatow	11
Wuhu General Hospital, Wuhu	2
Hope Hospital, Amoy	2
Chuanchow General Hospital, Fukien	12
St. Luke's Hospital, Hing Hwa, Fukien	4
German American Hospital, Tientsin	2
Manila (Dr. Wade)	7
C.M.S. Hospital, Hangchow	5
Sarah Walkup Hospital, Taichow	3
Foochow Hospital, Foochow	2

1,601 Paraffin Blocks were prepared and 4,250 microscopic preparations mounted.

Autopsies—13 cases were performed—10 for St. Luke's Hospital and three for Lester Chinese Hospital.

Media Rooms :

The amount of Media made during year 1934, was as follows :

Total amount of media	571.6	litres
Total tubes distributed	29,510	
Total flasks distributed	1,230	
Total plates made	507	

Of the above total amount of Media :

Meat Infusion Bouillon	amounted to 188.95	litres
Meat Infusion Agar	„ „ 124·77	„
C.B.P.P. Broth	„ „ 57·499	„
Nutrient Agar	„ „ 35·1	„
Alkaline Nutrient Agar	„ „ 28.15	„
Brom Cresol Purple Sugar Medium	„ „ 23.46	„
Hormone Broth	„ „ 14·99	„

The remaining 98.68 litres consisted of Nutrient Gelatine, Liver Digest Broth, Alkaline Peptone Water, Peptone Stock Sol., Neutral Peptone Water, Nutrient Broth, Kinsella's Nutrose Gelatine Agar, Salt Free Agar, Petroff's Egg Medium, Lead Acetate Agar, Potato Slant, Urea Splitting Medium, Dextrose

Beef Infusion Broth, Litmus Milk, Glycerine Bile Potato Medium, Carbol Agar, Loeffler's Blood Serum Slant, Cooked Meat Medium, Glycerine Agar, Ox Bile Medium, C.B.P.P. Agar, Meat Infusion Semi-solid Medium, Nitrate Sol., MacConkey's Solid Medium, Martin's Stomach Digest Sol., Dunham's Peptone Water, Copper Uyei Medium, Brain Veal Agar, Diluted Milk Medium, Glucose Bouillon, Sabouroud's Medium, Hiss Serum Water and Veal Broth.

PHOTOGRAPHIC LABORATORY

Condensed Summary of Work Done in 1934

For	*Photo-micrographs*	*All Other Subjects*	*Totals*	*Prints Made*	*Slides Made*
Directorate	—	80	80	333	4
Division I	64	191	255	805	120
Division II	48	333	381	3,516	219
Division III	172	175	347	1,388	375
Library	—	42	42	42	—
Experimental	1	50	51	—	5
Special	29	19	48	248	48
Technical Inst.	—	175	175	610	1
	314	1,065	1,379	6,942	772

A Slide Library was instituted for the Pathological Division—375 slides were added to it in 1934. A complete Reference Library of all Institute Photographs is retained in albums in the Laboratory. Each Head of Division receives a copy of every photograph concerning that Division.

The Department is in charge of the Lecture-Hall equipment and handles the projection of slides for all lectures: certain improvements in the technique of projection were instituted during the year. The Department also serves in a consulting capacity on all matters relating to Scientific Photography.

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REPRINTS

Reprints of publications mentioned in this report are generally available to research workers and others on application to Heads of Divisions or to the Registrar.

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